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Extension
PB724

Canning Foods

Fruits • Vegetables • Pickles • Jellies

THE UNIVERSITY of TENNESSEE
INSTITUTE of AGRICULTURE

Canning Foods

Fruits

Vegetables

Pickles

Jellies

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CONTENTS

Introduction 3

Canning Fruits and Vegetables

Canning 5
Procedure for Canning Fruits 7
Altitude Table – Water Bath 8
Fruit and Tomato Recipes 9
Timetable for Fruits and Tomatoes 13
Scorecard for Fruits and Tomatoes 14
Procedure for Canning Vegetables 15
Operation of Pressure Canner 15
Altitude Table – Pressure Canning 16
Vegetable Recipes 18
Timetable for Canning Vegetables 23
Scorecard for Vegetables 24
Questions and Answers 25

Pickles and Relishes

Introduction 26
Types of Pickles and Relishes 26
Ingredients 26
Equipment 27
Procedures for Safe Pickling 27
Pickle and Relish Recipes 28
Scorecard for Pickles and Relishes 36
Pickle Troubles and What Causes Them 37

Jams, Jellies and Preserves

Introduction 38
Ingredients 38
Equipment 38
Procedure for Making Jams, Jellies and Preserves 39
Jelly Recipes 39
Jam Recipes 40
Preserves Recipes 41
Fruit Butter Recipes 42
Scorecard for Jam, Jelly and Preserves 43
Common Problems with Jam, Jelly and Preserves 44
Metric Chart 44
Definition of Preservation Terms 45

Index 46

INTRODUCTION

Preserving food is more than an art; it is a science. Scientists and home economists have established that certain procedures are essential for a given food to make it safe, as well as retain its color, flavor, texture and nutrients. Standard recipes are designed with these research findings in mind and, when carefully followed, insure both a high-quality and a safe product.

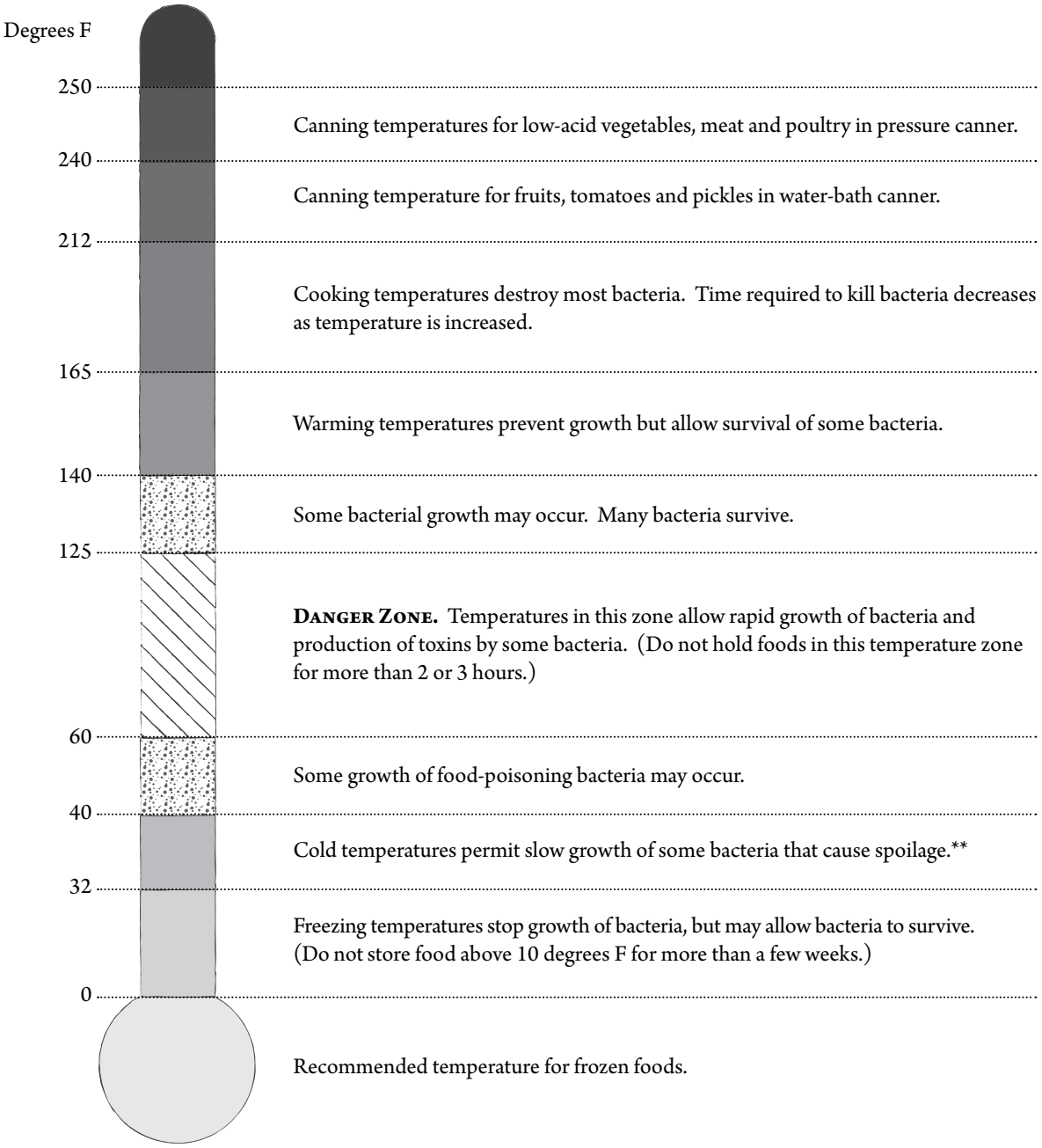
Food is preserved by using methods that destroy or hinder the growth of microorganisms, such as molds, yeast and bacteria. These organisms may be present in the soil, on the food, in the air, on equipment or on work surfaces.

Yeasts, molds and bacteria must be destroyed during processing to prevent the food from spoiling. The correct amount of time to process varies with the kind of food. Sufficient heat for a specified length of time kills microorganisms and insures a safe product. Processing also helps to secure an airtight seal when using closures containing sealing compound.

Preventing enzymatic changes in food is another concern when preserving food. Enzymes are chemical substances found in all animals and plants. These enzymes aid in the maturing and ripening processes. If not destroyed or inactivated, enzymes cause changes in color, flavor and texture. In the canning process, enzymes are destroyed by heat.

Temperature of Food*

For Control of Bacteria



***USDA Keeping Food Safe to Eat, Home & Garden Bulletin, #182.**

****Do not store raw meats for more than 5 days or poultry, fish or ground meat for more than 2 days in the refrigerator.**

CANNING

Canning is the process of sterilizing and sealing foods in airtight containers to preserve them. To retain nutrients and optimum quality, preserve fruits and vegetables when at their peak of freshness. Clean the food thoroughly before processing. Salt and/or sugar may be added to canned fruits and vegetables but these ingredients are not essential for a safe product.

Selecting Equipment For Canning

Jars: Select standard canning jars. These jars should have the word "Mason™" printed somewhere on the jar. In the past, mayonnaise, peanut butter and pickle jars have been designed for commercial use (one-time use only) and may not have been heat-treated. Unless jars are strong enough to withstand high temperatures, they may break when used for canning. However, some commercial companies are now using jars that are acceptable for home canning. Just be sure to look for the word "Mason™" on the jar.

Check the mouth of jars for nicks or cracks; defects prevent airtight seals. This is especially important since the sealing compound of the flat metal lid must stick to the rim of the jar to make the seal.

Lids: Select the two-piece metal lid (self-sealing lid). The two-piece lid consists of a screwband with a flat metal lid; the flat metal lid contains the sealing compound. The closure is screwed on the jar mouth firmly by hand.

When the metal screwband is tight, this lid has enough "give" to let air escape during the processing. When taken from the canner, the two-piece lid needs no further tightening.

Sometimes the bands on the two-piece metal lids are loose when the hot jar is removed from the canner. **Do not attempt to tighten.** Often the lid has started to seal and further tightening will break the partial seal. After a hot jar is removed from the canner, some time may elapse before a "popping" sound is heard. This sound indicates the jar has sealed.

Follow directions given by the manufacturer concerning the heating of flat metal lids. Sealing compounds may vary in composition and require different heat treatments.

Canners: A boiling waterbath canner is used for fruits, tomatoes and pickled vegetables. These acid-containing foods may be processed safely in boiling water for a specified length of time, depending on altitude. **A pressure canner** is used for all meats and vegetables. To safely process these low-acid foods, temperatures higher than boiling are needed: 240 degrees F (116 degrees C). Use pounds pressure as given in the altitude table.

Waterbath Canner: Waterbath canners may be purchased on the market, or any large container meeting the requirements of a waterbath canner may be used. The container must be deep enough to hold jars placed on a rack and allow 2 to 4 inches of water above jar tops. A rack with dividers will hold jars in place and prevent them from touching each other or the sides of the canner during processing. The container must also have a cover.

If it is deep enough, a pressure canner may be used as a waterbath. Cover but do not fasten. Leave the petcock or vent wide open so that steam escapes and no pressure is built up inside the canner.

Pressure Canner: Pressure canners are available in different designs, materials and sizes. Directions for use should accompany each canner. Follow these directions carefully.

Methods of Filling Jars

Some foods may be placed in containers raw, or they may be preheated then packed into the jars hot. Both methods have their advantages.

Hot Pack: Heat food in syrup, juice or water before filling jars. Keep food at or near boiling temperature and pack fairly loosely into jars.

Raw Pack*: Fill jars with raw food and cover with boiling hot syrup, juice or water. Pack raw fruits and vegetables tightly, because they tend to shrink during processing. Pack raw corn, lima beans and peas loosely, because they expand.

** "Raw pack" is the term now used in place of cold pack.*

CANNING FRUITS

Fruits, tomatoes and pickled vegetables are acid foods and are canned in the boiling waterbath canner.

Selecting Fruit

For best flavor and texture, select fresh, firm, ripe fruit and process as soon as possible. If fruit must be held a short time before canning, keep in a cool place.

Preparing Fruit for Canning.

Wash, peel and core fruit. To prevent darkening of light-colored fruits during preparation, drop pieces into a water solution containing 3000 milligrams of ascorbic acid (vitamin C)* per gallon. Drain or lift from solution and proceed as directed under hot or raw pack methods to fill jars. Avoid leaving food in water solution longer than 20-25 minutes to prevent loss of food value and water-soaking of food.

Yield of Canned Fruits from Fresh

Fruits	*Fresh*	*Canned*
Apples	1 bu. (48 lbs.) 2½ -3 lbs.	11 qts. 1 qt.
Apricots	1 bu. (50 lbs.) 2-2½ lbs.	18-22 qts. 1 qt.
Berries (except strawberries)	1 crate (24 qts.) 1½ -2 lbs. (1-2 qts.)	12-18 qts. 1 qt.
Cherries (canned, unpitted)	1 bu. (56 lbs.) 2-2 ½ lbs.	22-32 qts. 1 qt.
Peaches	1 bu. (48 lbs.) 2-3 lbs.	18-24 qts. 1 qt.
Pears	1 bu. (50 lbs.) 2-3 lbs.	20-25 qts. 1 qt.
Plums	1 bu. (56 lbs.) 1½ -2½ lbs.	22-30 qts. 1 qt.
Strawberries	1 crate (24 qts.) 1½ -3 lbs.	12-16 qts. 1 qt.
Tomatoes	1 bu. (53 lbs.) 2½ -3½ lbs.	15-20 qts. 1 qt.

*or use commercial mixture according to manufacturer's instructions.

Can fruit with or without sweetening. Sugar helps cooked fruit to retain its shape, color and texture. For most fruits, sugar is combined with liquid (water or juice extracted from fruit) to form a syrup. The syrup may be thin, medium or heavy, depending on the sweetness of the fruit and personal preference.

Sweeteners

Light-colored corn syrup or mild-flavored honey may be used to replace half of the sugar for canning fruit. Do not use dark sugar or strong-flavored syrups, as they may darken or change the flavor of the fruit.

Artificial Sweeteners: For correct amount, substitute sweetener for sugar as directed on label. Process artificially sweetened fruit the same as for sweetened.

Without Sugar

Sugar is not an essential ingredient in the canning of fruit; so it may be omitted. Fruit may be satisfactorily canned in its own juice or in water to result in a product lower in calories and cost than the sweetened fruit. Process unsweetened fruit the same as the sweetened fruit.

Head Space

Leave space between the packed food and the jar lid. This allows for the expansion of food during processing.

To prepare the syrup, select from the following table:

Type of syrup	*Amount of water or juice (cups)*	*Amount of sugar (cups)*	*Yield (cups)*
Light	4	1	4¾
Medium	4	1¾	5
Heavy	4	2	5⅓
Boil sugar and liquid for one minute.			

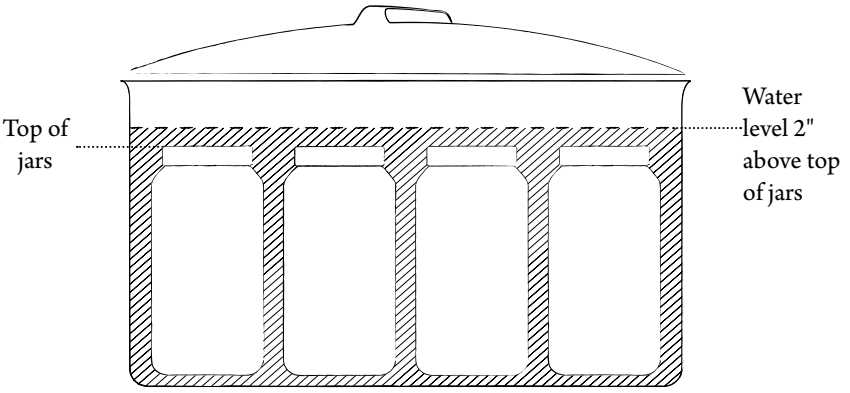
Boiling Waterbath

(See below)

For raw pack, place the filled jar in hot (not boiling) water; bring to boiling. Allow water to cover jars at least 2 inches.

For hot pack, place filled jars in boiling water.

Add additional boiling water to cover if necessary to bring water level 2 inches over the top of jars. Place lid on waterbath container and bring quickly to a rolling boil. Start counting processing time when and not before water returns to boiling. Adjust heat to maintain a steady boil. When time is completed, carefully raise the lid away from the body to allow steam to escape and prevent burns. Immediately remove jars from the canner. Let jars cool naturally (avoid drafts) on a rack. Do not cover. When jars are at room temperature, label with name of product and date. Store canned foods in a cool, dry place.



Processing Time for Fruits, Tomatoes and Pickles
Boiling Waterbath
Processing Time Depends on Altitude

At Altitudes:

0-1000 ft.	*1001-3000 ft.*	*3001-6000 ft.*	*Above 6000 ft.*
Use time given for specific recipe in this publication (see recipes)	Add 5 minutes to time given for specific recipes.	Add 10 minutes to time given for specific recipes.	Add 15 minutes to time given for specific recipes.

Recipes for Fruits and Tomatoes

Processing times recommended in this publication are correct for much of the state except in the high elevations. For these high areas, add processing time according to the table on page 8. Learn the altitude in your area. Consult with your Extension agent or local district soil conservationist.

Preparing and Canning Fruits

Processing times as given in these recipes are for altitudes of 1,000 feet or less. If you live at a higher altitude, add times as given in altitude table on page 8. Consult your Extension agent or local district conservationist with soil conservation service for altitude where you live.

Processing time in boiling waterbath at 212 degrees F (100 degrees C) in minutes			
Fruit	*Head Space*	*Pint*	*Quart*
APPLES Pare, core and cut into slices. Drop slices in a solution containing 3000 mg ascorbic acid (vitamin C)* per gallon of water to prevent darkening. Drain. **Hot Pack:** Boil apple slices 5 minutes in thin syrup or water. (Refer to syrup chart on page 8.) Adjust jar lids. Process.	½ inch	20	20
APPLESAUCE Select apples that mash easily when cooked. Pare, quarter and core. Add only enough water to prevent apples from scorching and simmer until fruit is tender. Mash or put fruit through a sieve. Reheat sauce. Pack hot. Adjust lids. Process.	¼ inch	15	20
APRICOTS Follow method for peaches. Procedure is given on page 10.			
BERRIES (except strawberries) Wash berries; lift out of water and drain. **Hot Pack:** Add ½ cup of sugar to each quart of fruit. Put in covered pan and heat to boiling. Pack hot fruit in jars. **Raw Pack:** Fill jar with fruit. To insure a full pack, shake jar while filling. Cover fruit with boiling syrup. (Refer to syrup chart on page 8.)	½ inch ½ inch	15 15	15 20

*or use commercial mixture according to manufacturer's instructions.

Preparing and Canning Fruits (continued)
For altitudes higher than 1000 feet, adjust for altitude (see page 8).
Processing time in boiling waterbath at 212 degrees F (100 degrees C) in minutes

Fruit	*Head Space*	*Pint*	*Quart*
CHERRIES Wash cherries. Remove pits, if desired. **Hot Pack:** Add ½ cup sugar per quart of fruit. Add ½ cup water per quart of fruit to unpitted cherries. Cover pan. Bring to boil. Pack hot. Adjust lids. Process. **Raw Pack:** Fill jar with fruit. To insure a full pack, shake jar while filling. Cover with boiling syrup. (Refer to syrup chart on page **8**.) Adjust lids. Process.	½ inch ½ inch	15 25	20 25
PEACHES Wash peaches and remove skins. Skins may be removed by peeling, but an easier method is to dip fruit into boiling water for about one minute, or until skin slips. Cool immediately in cold water. Drain and remove skins. Drop fruit pieces into a solution containing 2 tablespoons each of salt and vinegar per gallon of water. Drain before packing. **Hot Pack:** Heat peaches through in hot syrup. (A very juicy fruit may be heated with sugar only.) Pack hot. Cover with boiling syrup. Adjust lids. Process. **Raw Pack:** Fill jar with raw fruit. Cover with boiling syrup. (Refer to syrup chart on page **8**.) Adjust lids. Process.	½ inch ½ inch	20 25	25 30
PEARS Wash and peel. Cut in halves and core. Follow directions for hot pack as recommended for peaches, except boil 5 minutes in syrup before filling jars.	½ inch	20	25
PLUMS Wash fruit. Freestone varieties may be halved and pitted. When canning whole plums, prick skins to prevent bursting of fruit. **Hot Pack:** Heat plums in syrup or juice to boiling. (A very juicy fruit may be heated with sugar only.) Pack hot. Cover with boiling liquid. Adjust lids. Process. **Raw Pack:** Fill jar with raw fruit. Cover with boiling syrup. (Refer to syrup chart on page 8.) Adjust lids. Process.	½ inch ½ inch	20 20	25 25
RHUBARB Wash and trim. Cut into ½-inch pieces. Add ½ cup sugar to each quart of fruit. Let stand three to four hours to draw out juice. Heat to boiling. Pack hot. Cover with boiling juice. Adjust lids. Process.	½ inch	15	15

Preparing and Canning Fruits (continued)
For altitudes higher than 1000 feet, adjust for altitude (see page 8)
Processing time in boiling waterbath at 212 degrees F (100 degrees C) in minutes

Fruit	*Head Space*	*Pint*	*Quart*
STRAWBERRIES Select firm, ripe strawberries. Wash; lift out of water and drain. Hull (cap) berries and measure. **Hot Pack:** Carefully mix ½ to ¾ cup sugar to each quart of berries. Let stand in a cool place for approximately five hours. Heat at low temperature until berries are hot. Pack hot. Adjust lids. Process.	½ inch	15	15
TOMATOES – CRUSHED (with no added liquid) Wash tomatoes and dip in boiling water for 30 to 60 seconds or until skins split. Then dip in cold water, slip off skins and remove cores. Trim off any bruised or discolored portions and quarter. Heat one-sixth of the quarters quickly in a large pot, crushing them with a spoon as they are added to the pot. This will exude juice. Continue heating the tomatoes, stirring to prevent burning. Once the tomatoes are boiling, gradually add remaining quartered tomatoes, stirring constantly. These remaining tomatoes do not need to be crushed. They will soften with heating and stirring. Continue until all tomatoes are added. Then boil gently five minutes. Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Add 1 teaspoon of salt per quart to the jars, if desired. Fill jars immediately with hot tomatoes, leaving ½ inch headspace. Adjust lids and process in a boiling waterbath – pints 35 minutes; quarts 45 minutes.	½ inch	35	45
TOMATOES, WHOLE OR HALVES Canning tomatoes, whole or halves, select tomatoes that are neither overly ripe or green. Wash gently to avoid bruising. Remove stem ends and trim. Dip in boiling water for 30 to 60 seconds, then quickly dip in cold water. Slip off skins and remove core. Leave whole or cut in half. Add 2 tablespoons of bottled lemon juice or ½ teaspoon of citric acid to each quart jar. One teaspoon of salt may also be added if desired. Heat some quartered tomatoes to obtain juice. **Hot Pack:** Put whole or halves of tomatoes in a saucepan, completely cover them with tomato juice and boil gently for five minutes. Fill jars with tomatoes, leaving ½ inch headspace. Adjust lids. Process. **Raw Pack:** Add 2 tablespoons of bottled lemon juice or ½ teaspoon citric acid to each quart jar. One teaspoon salt may also be added if desired. Fill jars with raw tomatoes. Cover tomatoes with hot juice, leaving ½-inch headspace. Adjust lids. Process. Note: To pressure can tomatoes, see page 22.	½ inch ½ inch	85 85	85 85

Preparing and Canning Fruits (continued)
For altitudes higher than 1000 feet, adjust for altitude (see page 8).
Processing time in boiling waterbath at 212 degrees F (100 degrees C) in minutes

Fruit	*Head Space*	*Pint*	*Quart*
TOMATO JUICE Select firm ripe tomatoes. Do not use tomatoes from dead or frost-killed vines. Wash, remove stem ends and trim away bruised or decayed spots. Work fast – juice is less likely to separate if you heat tomatoes immediately after cutting. To prevent juice from separating, quarter three or four tomatoes and place in a large kettle. Heat tomatoes to boiling while stirring and crushing them. Keep heat high under the kettle while adding tomatoes at a rate slow enough to sustain a boiling temperature. Stir and crush tomatoes at frequent intervals. Boil five minutes after all tomatoes have been added; remove kettle from heat. Put tomatoes through sieve or food mill. (If juice separation is not a concern, simply slice or quarter tomatoes in a large saucepan. Crush, heat and simmer five minutes before juicing.) Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Heat juice again to boiling. Fill hot jars with hot juice, leaving ½-inch headspace. Adjust lids. Process.	½ inch	35	40
TOMATO SAUCE Wash and trim firm, ripe tomatoes. Cut into pieces. Simmer, stirring frequently until softened. Press through a sieve. Cook pulp until reduced by one-half. Add 2 tablespoons bottled lemon juice or ½ teaspoon citric acid to each quart jar. Add ¼ teaspoon salt to each cup. Pour hot sauce into jars. Adjust lids. Process.	½ inch	35	40
FRUIT JUICES Wash, stem, remove pits and crush fruit. Slowly heat to simmering. Strain through cloth. Add 1 to 2 cups of sugar to each gallon of juice. Adjust lids. Process in boiling waterbath.	½ inch	10	10
GRAPE JUICE Wash, remove stems and crush grapes. Add water to cover and heat to boiling. Reduce heat and simmer for 10 minutes. Strain through cloth and let stand in refrigerator for 24 hours. (Juice is allowed to stand at refrigerator temperature for 24 hours and strained to remove tartrate crystals. The crystals are formed from natural substances in the grapes.) Strain juice again. Add 1 to 2 cups sugar to each gallon of juice. Heat juice to boiling. Fill jars with hot juice. Adjust lids. Process in boiling waterbath.	¼ inch	10	10

Time Table for Canning Fruits and Tomatoes
Processing time in boiling waterbath at 212 degrees F (100 degrees C) in minutes

Fruit & Tomatoes	*Type Pack*	*Pints*	*Quarts*
Apples	Hot pack	20	20
Applesauce	Hot pack	15	20
Apricots	Hot pack Raw pack	20 25	25 30
Berries (except strawberries)	Hot pack Raw pack	15 15	15 20
Cherries	Hot pack Raw pack	20 25	25 30
Peaches	Hot pack Raw pack	20 25	25 30
Pears	Hot pack	20	25
Plums	Hot pack Raw pack	20 20	25 25
Strawberries	Hot pack	15	15
Tomatoes (whole or halves)	Hot pack Raw pack	85 85	85 85
Tomatoes – Crushed	Hot pack	35	45
Tomato Juice	Hot pack	35	40
Tomato Sauce	Hot pack	35	40

Scorecard for Judging Canned Fruit

		Excellent	*Good*	*Fair*	*Poor*
Product	Uniformly well-ripened, uniform and appropriate size, no defects, shape well-preserved, fills without crowding container, evenly distributed in jar.	☐	☐	☐	☐
Color	Natural, clear, bright, no artificial coloring or preservative used.	☐	☐	☐	☐
Texture	Tender, plump, firm, neither overcooked, mushy or uncooked in appearance.	☐	☐	☐	☐
Syrup	Clear, bright, natural color of fruit, no sediment or foreign matter.	☐	☐	☐	☐
Container	Standard canning jar, clear glass, clean, neatly labeled.	☐	☐	☐	☐

CANNING VEGETABLES

Selecting Vegetables for Canning

Most varieties of vegetables grown and harvested for eating purposes are suitable for canning. Some varieties are selected because they grow well in a particular area and are family favorites.

Only fresh, properly matured vegetables should be canned. A good rule to follow is to can them when they are just right for table use. For uniform products, it is wise to sort some vegetables according to size and degree of maturity.

Preparing Vegetables for Canning

Regardless of which vegetable is canned, a good rule to follow is "from garden to the canner as quickly as possible." If the vegetable must be kept longer, store in the refrigerator or in the coolest place available.

Wash small amounts of vegetables quickly under running water, or through several changes of water. Lift food out of water each time so dirt will not collect on food again.

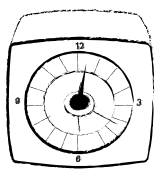
Methods of Filling Jars

Hot Pack Methods: Preheat vegetables in water or steam. Heat small amounts, two or three quarts, at a time. Use liquid from vegetables to fill jars after packing to conserve nutrients. Add boiling water when there is not enough cooking liquid.

Raw Pack Methods: Pack cold, raw vegetables into containers and cover with boiling water. Pack corn, lima beans and peas loosely because they expand.

Headspace

Leave space between the packed food and the jar lid. This space allows for the expansion of the food during processing.



Timer

Petcock

Gauge

Pressure Canner

Process all vegetables except tomatoes and pickled vegetables in a pressure canner.

Canners are made with different types of gauges. Carefully follow the manufacturer's directions for use of a specific canner.

1. When preparing a pressure canner for processing, add 2 to 3 inches of boiling water. The amount of water to use depends on the shape and size of the canner.
2. Put the rack in the bottom of canner; place canner on the range to heat.
3. As each jar is filled and lid is adjusted, place the jar on the rack in the canner.
4. Leave space between each jar to allow for the circulation of steam around the jars.
5. Adjust the pressure canner lid according to the design. For canners with petcocks, make sure the petcock is open. Allow steam to escape from the petcock for at least 10 minutes. This allows air to be pushed from the canner. Air left in the canner may interfere with a true pressure reading.*
6. For a dial gauge canner, close petcock and allow pressure to rise to 11 pounds 240 degrees F (116 degrees C). Increase pounds pressure for elevations over 1000 feet. For weighted gauges, use a 10-pound weight and let the steam build until it escapes from the gauge.
7. For a dial gauge canner, adjust the range unit so the gauge will remain on 11 pounds. If pressure is allowed to fluctuate during processing, there may be a loss of liquid from the jar. For weighted gauges, the gauge should move and make noise. Adjust heat so that gauge begins to jiggle or rock as the manufacturer describes.

*if weighted gauge is used, allow steam to escape from vent for 10 minutes.

8. Start counting time. Consult pages 18-21 for length of time recommended for the vegetables.
9. When the required time is up, turn off the range unit and slide the canner off. Let the canner cool slowly. Do not hasten the cooling in any way.
10. After the gauge has been at 0 degrees F for about five minutes, slowly open the petcock. Usually there will be some steam escaping from the petcock.
11. Carefully raise the lid away from body to prevent getting a burn from the escaping steam.
12. Remove each hot jar with canning tongs. If tongs are not available, get a heavy towel and place over jar. Lift out and place the hot jar on a rack or on clean paper, thickly folded, away from drafts to cool. After all jars are removed from the pressure canner, pour out the water remaining in the canner.
13. Wash the inside of the canner and rack with soapy water; rinse and dry.
14. Wipe the lid with a soapy cloth, then with a rinsed cloth; dry.
15. After the jars have cooled for a day, store them in a cool, dry place away from bright light. Protect the jars from excessive cold, since food may freeze and break the jar.

*If weighted gauge is used, allow steam to escape from vent for 10 minutes.

Altitude Table for Vegetables
Pressure Canner (240 degrees F)
Pressure Depends on Altitude

Weighted-Gauge Pressure Canner	*Weight to Use*
Sea level to 1,000 feet	10-pound
Above 1,000 feet	15-pound
Dial-Gauge Pressure Canner	*Pressure on Dial*
Sea level to 2,000 feet	11 pounds
2,001 to 4,000 feet	12 pounds
4,001 to 6,000 feet	13 pounds
6,001 to 8,000 feet	14 pounds

Note: For a weighted-gauge canner, use 15 pounds pressure if you live at an altitude above 1,000 feet.

Guard Against Spoilage

Process all vegetables, except tomatoes and pickled vegetables, in a pressure canner. When canning is done in a waterbath canner, the temperature must reach a boiling point (212 degrees F, 100 degrees C at elevations of 1000 feet or less), which is suitable for acid-containing foods such as fruit and tomatoes. Low-acid vegetables require a higher temperature (240 degrees F, 116 degrees C) to destroy spores of *Clostridium botulinum.*

Clostridium botulinum spores are found in soil, air and on raw foods. In this condition they are not dangerous if eaten, as these spores do not grow or produce a toxin in the presence of air. A high-acid medium also hinders their growth. But spores of *Clostridium botulinum*, if not destroyed, grow well without air in sealed jars of low-acid foods. As these spores grow, they produce a very poisonous toxin. This is the toxin responsible for the food-borne illness known as botulism.

Food inside a pressure canner can be heated to high enough temperatures to destroy the spores of *Clostridium botulinum.*

Boil all home-canned, low-acid food for 15 minutes before tasting. Boil corn and spinach 20 minutes. Bring food to a rolling boil and then count time. This destroys the toxin if any should be present.

Do not use an oven for canning. Oven canning is dangerous, due to the possibility of the jars bursting. Also, the temperature of the food in jars does not reach the 240 degrees F (116 degrees C) necessary to destroy the spores of *Clostridium botulinum.* The temperature registered on the oven regulator is not the same as the temperature inside the jar of food.

Keep in Mind the Following Steps When Canning Vegetables

1. Select mature, yet tender vegetables.
2. Bring from the garden to the canner as soon as possible.
3. Wash and prepare vegetables.
4. Preheat vegetables if hot-pack method is used.

5. Pack in standard canning jars; cover with liquid.
6. Wipe jar mouth and seal according to lid directions.
7. Place jar on rack in pressure canner with 2 to 3 inches of boiling water.
8. Adjust pressure canner lid.
9. Let steam escape 10 minutes from petcock,* then close.
10. Start counting time when pressure gauge registers the recommended pounds pressure for altitude.
11. Use recommended timetable.
12. When time is up, slide canner from range unit; let cool.
13. About five minutes after gauge has returned to zero, open petcock slowly. For weighted gauges, remove the weight from the vent part.
14. Open lid from opposite side of the canner first, then all the way.
15. Take out hot jars, one at a time.
16. Place on rack to cool – out of a draft.
17. The next day, store canned food in a cool, dark, dry place.

* For canners that do not have a petcock, allow steam to escape from vent for 10 minutes.

Although the altitude for much of Tennessee is 1,000 feet or less, many areas are in the higher elevations. Check with your Extension agent or your local district conservationist or with the Soil Conservation Service for the altitude where you live.

Yield of Canned Vegetables from Fresh

Vegetable	*Fresh*	*Canned*
Asparagus	1 bu. (45 lbs.) 4 lbs.	11 qts. 1 qt.
Beans- Lima, in Pods	1 bu. (32 lbs.) 4 - 5 lbs.	6 - 8 qts. 1 qt
Beans – Snap	1 bu. (30 lbs) 1½ - 2 lbs.	15 - 20 qts. 1 qt.
Beets, without tops	1 bu. (52 lbs) 2½ - 3 lbs.	17 - 20 qts. 1 qt.
Carrots, without tops	1 bu. (50 lbs) 2½ - 3 lbs.	16 - 20 qts. 1 qt.
Corn - Sweet, in husks	1 bu. (35 lbs) 6-16 ears	8 - 9 qts. 1 qt.
Okra	1 bu. (26 lbs.) 1½ lbs.	17 qts. 1 qt.
Peas – Green, in pod	1 bu. (30 lbs.) 2 - 2½ lbs.	12 - 15 pts. 1 pt.
Pumpkin	50 lbs. 3 lbs.	15 qts. 1 qt.
Spinach	1 bu. (18 lbs.) 2 - 3 lbs.	6 - 9 qts. 1 qt.
Squash – Summer	1 bu. (40 lbs) 2 - 2½ lbs.	16 - 20 qts. 1 qt.
Sweet Potatoes	1 bu. (55 lbs.) 2½ - 3 lbs.	18 - 22 qts. 1 qt.
Tomatoes	1 bu. (53 lbs.) 2½ - 3 lbs.	15 - 20 qts. 1 qt.

Preparing and Canning Vegetables

Processing times given in these recipes are for 1,000 feet or less. If you live at a higher altitude, increase pressure as given in Altitude Table on page 8. Learn the altitude in your area. Check with your Extension agent or your local district conservationist with the Soil Conservation Service.

Note: For a weighted-gauge canner, use 15 pounds pressure if you live at an altitude above 1,000 feet.*

Processing time (min.) pressure canner at 240 degrees F (116 degrees C)
10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge

Vegetable	*Head Space*	*Pint*	*Quart*
ASPARAGUS Wash, trim scales and tough ends. Wash again and cut into 1-inch pieces. **Hot Pack:** Cover asparagus with boiling water. Boil 2-3 minutes. Pack hot, filling jars loosely. Add ½ teaspoon salt to pints; 1 teaspoon salt to quarts. Cover with boiling liquid. Adjust lids. Process.	1 inch	30	40
Raw Pack: Pack raw asparagus tightly in jars (do not crush). Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water. Adjust lids. Process.	1 inch	30	40
BEANS, Fresh Lima Select young tender beans, shell and wash. **Hot Pack:** Cover beans with boiling water. Bring to boil. Pack hot, filling jars loosely. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water. Adjust lids. Process.	1 inch	40	50
Raw Pack: Pack raw beans into jars. Leave 1 inch headspace for pints; 1½ inch for quarts. Do not press or shake beans down. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water. Adjust lids. Process.	Refer to recipe	40	50
BEANS, Snap Select tender crisp pods. Wash beans, trim ends and break or cut into 1-inch pieces. **Hot Pack:** Cover beans with boiling water. Boil 5 minutes. Pack hot, filling jars loosely. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling cooking liquid. Adjust lids. Process.	1 inch	20	25
Raw Pack: Pack raw beans tightly in jar. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water. Adjust lids. Process.	1 inch	20	25
BEANS, Soy Use green soybeans. Follow directions for lima beans except increase processing time.	1 inch	55	65

* Check with your county Extension agent or your local district conservationist with the Soil Conservation Service for altitude where you live.

Preparing and Canning Vegetables (continued)
Processing time (min.) pressure canner at 240 degrees F (116 degrees C)
10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge

Vegetable	*Head Space*	*Pint*	*Quart*
BEETS Sort for size. Cut off tops, leaving 1 inch of stem. Leave roots attached. Cover with boiling water and boil until the skins slip easily (15-25 minutes). Skin and trim. Leave small beets whole. Cut medium and large beets into ½-inch cubes or slices; or halve or quarter. **Hot Pack:** Pack hot. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water. Adjust lids. Process.	1 inch	30	35
CARROTS Wash and scrape. Slice or dice carrots. **Hot Pack:** Cover carrots with boiling water. Bring to boil and simmer for five minutes. Pack hot. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling cooking liquid. Adjust lids. Process.	1 inch	25	30
Raw Pack: Pack raw carrots tightly into jars. Leave 1 inch headspace. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water to ½ inch from top. Adjust lids. Process.	Refer to recipe	25	30
CORN, Cream Style Select tender ears of corn. Husk, remove silk and wash. Cut corn from cob at center of kernel, then scrape cob. **Use pint jars only.** **Hot Pack:** To each quart of corn, add 2 cups of boiling water. Bring to boil. Pack hot. Add ½ teaspoon salt to each jar. Adjust lids. Process. **Raw Pack: Not Recommended**	1 inch	85	Not recommended
CORN, Whole Kernel Select tender ears of corn. Husk, remove silk and wash. Cut corn from cob at ⅔ the depth of the kernel. Caution: Do not scrape. **Hot Pack:** To each quart of corn, add 2 cups boiling water. Bring to boil and simmer 5 minutes. Pack hot. Cover with boiling cooking liquid, leaving 1 inch headspace, or fill jars to 1 inch from top with mixture of corn and liquid. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Adjust lids. Process.	1 inch	55	85
Raw Pack: Pack raw corn into jars. Leave 1-inch headspace. Do not shake or press down. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water to ½ inch from top. Adjust lids. Process.	Refer to recipe	55	85

Preparing and Canning Vegetables (continued)
Processing time (min.) pressure canner at 240 degrees F (116 degrees C)
10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge

Vegetable	*Head Space*	*Pint*	*Quart*
OKRA Select tender pods. Wash and trim. Leave pods whole or cut into 1-inch pieces. Cover with hot water and boil for 2 minutes. Fill jars with okra and cooking liquid. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Adjust lids. Process.	1 inch	25	40
PEAS, Fresh Blackeye Shell and wash peas. **Hot Pack:** Cover peas with boiling water and bring to a rolling boil. Drain. Pack hot. Leave 1¼-inch headspace in pints; 1½ inches in quarts. Do not shake or press peas down. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water to ½ inch from top. Adjust lids. Process.	Refer to recipe	40	50
Raw Pack: Pack raw peas in jars. Leave 1½-inch headspace in pints; 2 inches in quarts. Do not shake or press peas down. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling water to ½ inch from top. Adjust lids. Process.	Refer to recipe	40	50
PEAS, Fresh Green Shell and wash peas. **Hot Pack:** Cover peas with boiling water. Bring to boil and boil for 2 minutes. Pack hot peas loosely in jars. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with boiling cooking liquid. Adjust lids. Process.	1 inch	40	40
POTATOES, Cubed or Whole Wash, pare and cut into ½-inch cubes or choose small potatoes 1 to 2 inches in diameter. To prevent darkening, dip potatoes in brine (1 teaspoon salt to 1 quart water). Drain. Or use an ascorbic acid solution and drain. Cover with water and bring to boil. Boil cubes 2 minutes; boil whole potatoes 10 minutes; drain. **Hot Pack:** Pack hot. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. Cover with fresh boiling water. Adjust lids. Process.	1 inch	35	40

Preparing and Canning Vegetables (continued)
Processing time (min.) pressure canner at 240 degrees F (116 degrees C)
0 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge

Vegetable	*Head Space*	*Pint*	*Quart*
PUMPKIN, Cubed (do not mash) Wash and cut into sections. Peel, remove seeds and cut into 1-inch cubes. Add water to cover and bring to boil. Boil 2 minutes. Pack hot cubes to ½ inch from top. Caution: Do not mash or puree. Add ½ teaspoon salt to pints; 1 teaspoon to quarts. **Hot Pack:** Cover with hot cooking liquid, leaving ½-inch space at top of jar. Adjust lids. Process.	Refer to recipe	55	90
MIXED VEGETABLES or SOUP MIX *Yield: about 7 quarts* 6 cups sliced carrots 6 cups, whole kernel sweet corn 6 cups cut green beans 6 cups shelled lima beans 4 cups whole or crushed tomatoes 4 cups diced zucchini Wash and peel carrots, wash again and slice or dice. Husk corn, remove silk and wash. Cut corn from cob at ⅔ the depth of the kernel. Wash and trim green beans. Snap or cut into 1-inch pieces. Shell young, tender lima beans and wash. Trim, and slice or cube zucchini. Combine all vegetables including tomatoes in a large kettle and add enough water to cover pieces. Add 1 teaspoon salt per quart to the jar, if desired. Boil with hot pieces and liquid, leaving 1-inch headspace. Adjust lids and process. *Note: For other vegetable combinations, process the length of time needed for vegetables requiring the longest processing time.*	Refer to recipe	75	90
SPINACH AND OTHER GREENS Select fresh tender greens. Pick over and wash thoroughly, lifting greens out of wash water each time. Remove tough stems. **Hot Pack:** Cover greens with hot water and simmer in an uncovered pot for about 5 minutes or until greens are wilted. (Or, place 2½ pounds of greens in a cheesecloth bag and steam about 10 minutes or until well wilted.) Pack hot greens loosely into jars. Add ¼ teaspoon salt to pints; ½ teaspoon to quarts. Cover with fresh boiling water. Adjust lids. Process.	1 inch	70	90

Preparing and Canning Vegetables (continued)
Processing time (min.) pressure canner at 240 degrees F (116 degrees C)
10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge

Vegetable	*Head Space*	*Pint*	*Quart*
SQUASH, Winter (Acorn, Banana, Buttercup, Butternut, Golden Delicious or Hubbard)	Follow the preparation procedures for cubed pumpkin		
SWEET POTATOES Sort for size and wash. Boil or steam until partially soft (15-20 minutes). Skin and cut into uniform pieces. Caution: Do not mash or puree. Fill jars with hot potatoes. Add ½ teaspoon salt to pints; 1 teaspoon salt to quarts. Cover with fresh boiling water or medium syrup. Adjust lids. Process.	1 inch	65	90
TOMATOES (No added liquid) Tomatoes (whole or half) may be canned under pressure. Follow directions for preparation on page 11. Process.	½ inch	25	25
TOMATOES, CRUSHED Follow directions for preparation on page 11.	½ inch	15	15
TOMATO JUICE Follow directions for preparation on page 12.	½ inch	15	15

Reprocessing Unsealed Jars

If a lid fails to seal on a jar, remove the lid and check the jar-sealing surface for tiny nicks. If necessary, change the jar; add a new, properly prepared lid; and reprocess within 24 hours using the same processing time. Headspace in unsealed jars may be adjusted to 1½ inches and jars can be frozen instead of reprocessed. Foods in single unsealed jars can be refrigerated and consumed within three days.

Storing Canned Foods

Press the center of the lid to be sure the lid is "down," indicating a tight vacuum seal. Remove screw bands from cooled jars; wash the lid and jar to remove food residue. Label and date the jars and store them in a clean, cool, dark, dry place. Do not store jars above 95 degrees F or near hot pipes, a range, a furnace, in an uninsulated attic or in direct sunlight. Under these conditions, food will lose quality and may spoil. Dampness may corrode metal lids, break seals and allow recontamination and spoilage. Accidental freezing of canned foods will not cause spoilage unless jars become unsealed. If jars must be stored where they may freeze, wrap them in newspapers, place them in heavy cartons and cover with more newspapers and blankets.

Time Table for Canning Vegetables

For altitudes higher than 1000 feet, adjust for altitude (see page 16).

Processing time (min.) pressure canner at 240° F (116° C) 10 pounds pressure for weighted gauge; 11 pounds pressure for dial gauge			
Vegetable (Low-Acid)	*Type Pack*	*Pint*	*Quart*
Asparagus	Hot pack Raw pack	30 30	40 40
Beans, Lima	Hot pack Raw pack	40 40	50 50
Beans, Snap	Hot pack Raw pack	20 20	25 25
Beets	Hot pack	30	35
Carrots	Hot pack Raw pack	25 25	30 30
Corn, Cream Style	Hot pack Raw pack	85 95	Not recommended Not recommended
Corn, Whole Kernel	Hot pack Raw pack	55 55	85 85
Okra	Hot pack	25	40
Peas, Fresh, Blackeye	Hot pack Raw pack	40 40	50 50
Peas, Fresh, Green	Hot pack	40	40
Pumpkin, Cubed	Hot pack	55	90
Mixed Vegetables or Soup Mix	Hot pack	Length of time needed for vegetable requiring longest processing	
Spinach & Other Greens	Hot pack	70	90
Squash, Winter	Hot pack	55	90
Sweet Potatoes	Hot pack	65	90
Tomatoes, Whole or Half	Hot pack Raw pack	25 25	25 25
Tomatoes, Crushed	Hot pack	15	15
Tomato Juice	Hot pack	15	15

Scorecard for Judging Canned Vegetables

		Excellent	*Good*	*Fair*	*Poor*
Product	Uniform size, proper degree of maturity, no defects, shape well-preserved, container filled but not crowded, evenly distributed in jar, but not artistically arranged.	☐	☐	☐	☐
Color	Natural uniform color, no dark spots.	☐	☐	☐	☐
Texture	Tender, plump, firm – not overcooked.	☐	☐	☐	☐
Liquid	Clear, covers product, not cloudy, no bubbles, no sediment or foreign matter.	☐	☐	☐	☐
Container	Standard canning jar, clear glass, clean, neatly labeled.	☐	☐	☐	☐

QUESTIONS & ANSWERS

Q. Is it safe to can vegetables without using salt?

A. Yes, salt is not a necessary part of the canning process.

Q. What is the meaning of the term "process?"

A. In canning, "processing" is the method used in cooking the food to preserve it. For vegetables, this is done in a pressure canner. In other words, vegetables are put into jars and processed in a pressure canner.

Q. What causes white sediment in the bottom of jars of vegetables?

A. The white sediment may be due to minerals in the water, starch in the food or it may indicate spoilage. If food is soft or liquid is dark and murky, do not use.

Q. What is meant by blanching?

A. Food is dipped or plunged into boiling water or steam for a given length of time.

Q. What is meant by pre-cooking?

A. Food is cooked in a small amount of water before it is put into jars.

Q. Should all vegetables be blanched or precooked before processing?

A. No, but blanching or pre-cooking serves to set color and shrink certain products.

Q. Should the water in which foods are pre-cooked be used in packing?

A. Yes, if vitamins and minerals are to be retained.

Q. Why do beets lose their color?

A. When cut, the red juice bleeds from the beet. To prevent this color loss when canning, pre-cook beets with part of the stem and all of the roots left on.

Q. Why do foods darken in the top of jars?

A. Liquid did not cover food or food was not processed long enough to destroy enzymes.

Q. Does it damage vegetables to over-process them?

A. Over-processing may alter the texture and flavor of a product, but this will not affect its safety. If there is any doubt about timing, it is better to over-process than to under-process. Vegetables must be processed long enough to destroy spoilage organisms.

Q. How long should vegetables stand after gathering before they are canned?

A. The shortest time possible. If vegetables are to be held over for a time before canning, store them in a cool, well-ventilated place. Spread them out carefully or store in refrigerator.

Q. Why is there sometimes a loss of liquid during processing?

A. Loss of liquid may be due to fluctuating pressure in the pressure canner, food packed too tightly in jars or lowering pressure too suddenly. Constant pressure should be maintained during processing time. At the end of processing time, allow pressure to drop to zero naturally and wait two to five minutes before opening the lid.

Q. Can fruits be canned without heating if aspirin is used?

A. No. Aspirin cannot be relied on to prevent spoilage or to give satisfactory products. Adequate heat treatment is the only safe procedure.

Q. Is it safe to process food in the oven?

A. No, oven canning is dangerous. Jars may explode. The temperature of the food in jars during oven processing may not get high enough to insure destruction of spoilage bacteria.

Q. What causes fruit to float in jars?

A. Fruit is lighter than the syrup. Pack fruit tightly in jar, but do not crush it. Use a light syrup.

Q. Is canned food safe to use when the liquid is cloudy?

A. Cloudy liquid may be a sign of spoilage. Also, it may be caused by starch from over-ripe vegetables or from minerals in the water. If liquid is cloudy, boil the food. Do not taste or use any that foams during heating or has an odd odor.

Q. When canned fruits are bought in large containers, is it safe to can them in smaller containers?

A. Canned fruit may be heated through, packed and processed the same length of time as recommended for hot packs. Food canned in this way may be lower quality than if fruit had been canned when fresh.

CANNING PICKLES AND RELISHES

Pickles, crisp and spicy, stimulate the sense of taste and enhance the flavor of bland foods.

Pickles and relishes contain small amounts of nutrients, depending on ingredients used in making them. Most pickle products are low in calories, except for the sweet varieties.

Pickling is the process of preserving foods in brine or vinegar or a combination of the two.

Brine is made by combining salt with water in proportions to make either a weak, medium or strong solution. In some instances, salt is add directly to the food in the dry form and the brine is formed as juices are drawn out of the food.

Vinegar, an acid, acts as a preservative and contributes flavor different from the flavor produced by lactic acid fermentation that occurs during the brining process.

The method using both salt and vinegar calls for a short brining period before the vinegar is added.

Kinds of pickles and relishes are varied and numerous. Processing methods for each should be selected in keeping with the food to be processed and the desired product.

Types of Pickles And Relishes

Brined pickles go through a fermenting process for about three to five weeks. Dilled cucumbers and sauerkraut are in this group. During this curing process, color of the cucumber changes from a bright green to an olive or yellow green. The interior of the cucumber becomes uniformly translucent and the pickle develops a desirable flavor. When properly cured, the skin and interior of pickles are firm and tender. To prevent sour, salty, hard, rubbery, shriveled or mushy pickles, carefully follow recommended fermentation procedures.

Quick Process Pickles

This method includes:

Pickles that are brined for several hours, drained and then combined with boiling hot vinegar or heated with vinegar and processed.

Pickles that are combined with boiling hot vinegar or heated with vinegar to boiling temperature and processed without a previous brining period.

Fruit Pickles: These pickles are usually made from small whole fruits or fruit chunks and simmered in a spicy, sweet-sour syrup.

Relishes: Relishes are mixtures of chopped fruits or vegetables. They may be mild in flavor or hot and spicy.

Chutney: A mixture of fruits with dates and/or raisins seasoned with spices.

Selection

Use only good-quality fruits and vegetables. Select tender vegetables and fruit. Pears and peaches may be slightly underripe for pickling. Wax-coated cucumbers (bought from a vegetable counter) are not suitable for pickling whole because wax interferes with penetration of brine. Sort for uniformity of size and select the size best suited for the recipe being followed.

Use foods soon after gathering or purchasing when possible. If fruits and vegetables can not be used immediately, store in the refrigerator or in a well-ventilated, cool place. Discard fruits and vegetables that show any evidence of mold.

Ingredients

Salt: Pure, granulated salt is best. This is often sold as pickling or canning salt. It is sometimes called meat-curing salt. The non-caking material added to iodized and non-iodized table salt may make the brine cloudy. The iodine in iodized table salt may cause pickles to darken.

Vinegar: Use either cider or white distilled vinegar of 5 to 6 percent acidity (50 to 60 grain strength). Cider vinegar, used in most recipes, has a good flavor and aroma, but may discolor light foods. Distilled (white) vinegar is often used for onions and cauliflower where clearness of color is desirable.

Spices: Spices add flavor and aroma to pickles and both whole and ground spices are used in making them. For best flavor, always use fresh spices and store amounts that are not used immediately in air-tight containers.

Sugar: Use either granulated or brown sugar, depending on recipe.

Water: If hard water is used in brining, it may interfere with the formation of acid and prevent pickles from curing properly. Boil hard water for 15 minutes and remove from heat. Cover and let stand for 24 hours. Remove any scum that might have formed. Slowly pour water from containers so that sediment will not be disturbed. Discard sediment. Water is now ready to use.

Ingredients Found in Older Recipes

The following ingredients are still used in some of the older pickling recipes. These substances are not essential for making crisp, colorful pickles if up-to-date methods and good-quality ingredients are used in making them.

Lime: Lime is not essential for making crisp, firm pickles if good-quality ingredients are used and up-to-date methods are followed in making them. If recipe calls for lime, use food-grade pickling lime from the grocery store. Do not use agricultural or burnt lime.

Alum: Alum is not needed to make pickles crisp and firm if good-quality ingredients are used and up-to-date methods are followed in making them. It is better not to use alum, but if alum is used, be sure to measure it accurately. This ingredient can be purchased from the grocery store.

Equipment

Utensils: For brining, use a clean crock or stone jar, unchipped enamel-lined utensils or a large glass container. To cover vegetables while they are in brine, use a heavy plate or large glass lid that fits inside the container. Use a filled jar of water to hold the cover down so the vegetables are kept below the surface of the brine. A more recent method is to use a water-filled plastic bag, the kind intended for use with food. The bag covers the container, keeping contents at a correct level so that a plate is not needed. For heating pickling liquids, use unchipped enamelware, aluminum, stainless steel or glass. Do not use brass, copper, galvanized or iron utensils. Containers of these metals may react with acids or salts and form undesirable compounds or cause color changes in the pickles. Use large wooden or stainless steel spoons for stirring pickles.

Jars: Use standard canning jars with the word "Mason™" on them. Some food processors are now using "Mason™" jars. However, most jars from commercially canned food have not been heat-treated and may break when subject to home-canning methods.

Pack pickles or relish in jars and cover with liquid. Wipe the jar mouth with a clean, damp cloth or paper towel. Adjust the lid according to the manufacturer's directions.

Lids: Use the two-piece closure, which has a metal screw band and a metal lid with sealing compound. The metal screw bands may be re-used, but metal lids containing sealing compound may be used only once.

Waterbath Canner: Waterbath canners may be purchased on the market, or any large container meeting the requirements of a waterbath canner may be used. The container should be deep enough to hold jars placed on a rack and allow for 2 to 4 inches of water above jar tops. A rack with dividers will hold jars in place and prevent them from touching each other or sides of canner during processing. The container must also have a cover.

Procedures for Safe Pickling

To insure a safe and quality product, use fresh fruits and vegetables following standardized recipes and process as recommended for the product.

Filling Jars: Fill jars, leaving headspace at the top of the jar after brine or syrup has covered the pickles. Avoid over-packing jars so there will be enough headspace. Wipe the rim and threads of jars thoroughly. Small food particles left on the rim may prevent an airtight seal.

Adjusting Caps (Lids): Select the two-piece metal lid (a screw band with a flat metal lid; the flat metal lid contains the sealing compound). The closure is screwed on the jar mouth firmly by hand.

When metal screwband is tight, this lid has enough "give" to let air escape during processing. When taken from the canner, the two-piece lid needs no further tightening.

Sometimes the bands on the two-piece metal lids are loose when the hot jars are removed from the canner. DO NOT ATTEMPT TO TIGHTEN. Often the lid has started to seal and further tightening will break the partial seal. After a hot jar is removed from the canner, some time may elapse before a "popping" sound is heard. This sound indicates the jar has sealed. Follow directions of the manufacturer concerning the heating of the flat metal lids.

Heat Treatment: Heating is needed to destroy microorganisms that cause spoilage and to inactivate enzymes that may affect flavor, color and texture. Processing jars of pickles in a boiling waterbath is considered to be the best way to achieve adequate heat treatment.

The U.S. Department of Agriculture recommends the processing of all pickle products in a boiling waterbath. An open-kettle method is not recommended, since there is always danger of spoilage from microorganisms entering the food when it is transferred from kettle to jar.

For safe pickle products made from low-acid vegetables, always use vinegar of 5 percent acidity. Certain bacterial spores that are present in air, soil and raw foods grow well in sealed, air-tight jars of low-acid foods. As these spores (*Clostridium botulinum*) grow, they produce a poisonous toxin. The use of strong vinegar in combination with the heat treatment prevents the growth of these organisms.

Pickles and Relish Recipes

Processing times as given in these recipes are for altitudes of 1,000 feet or less. If you live at a higher altitude, add times as given in Altitude Table on page 8.

As recommended by the United States Department of Agriculture, processing times in a waterbath canner are given for all pickle recipes in this publication.

Brined Cucumbers

1. Wash cucumbers carefully in cold water to remove soil. Cut 1/16-inch slice from bottom end and discard· Leave ¼ inch of stem attached·
2. Fill crock or jar with cucumbers to within 3 or 4 inches of the top.
3. Cover cucumbers with a 10 percent brine made by using ½ cup salt to each quart water.
4. Place a heavy china or glass plate inside the fermentation container. Plate should be slightly less than the container opening. Use a weight to hold the plate down and keep the cucumbers at least 1-2 inches under the brine. A glass jar filled with water makes a good weight (do not use brick or cement block). A more desirable method of covering cucumbers during fermentation consists of placing a polyethylene bag filled with 3 quarts of water and 4½ tablespoons of salt on top of them. The water-filled bag seals the surface from exposure to air, and prevents the growth of yeast or molds. It also serves as a weight. For extra protection, the bag with water in it can be placed inside another polyethylene bag. Any bag used should be of heavyweight, water-tight material intended for use with foods. The amount of water in the bag may be adjusted to give just enough pressure to keep the fermenting food covered with brine.
5. The next day, in order to maintain a 10 percent brine solution, add 2 cups salt for each 10 pounds of cucumbers. Place salt on a plate or a cloth to prevent its sinking and forming too strong a brine on the bottom of the container.
6. At the end of the week and each succeeding week until cured, place on the plate or cloth ½ cup salt for 10 pounds of cucumbers.
7. Remove scum daily as it forms. If scum is left on, it will destroy the acidity of the brine. The acidity is necessary to prevent spoilage.
8. During fermentation, keep pickles in a moderately cool place with temperature preferably between 60 to 70 degrees F. At lower temperatures, the fermentation proceeds slowly. Above 70 degrees F, the fermentation tends to be souring, without gas production and poor flavor development.
9. Fermentation is completed when bubbles stop coming to the top. Test bubbles by tapping container on the side with your hand. As a second test, cut a cucumber in half; if it is the same color throughout and has no noticeable rings, fermentation is completed.
10. If the cucumbers are to be kept for some time, place 1 cup salt on the plate and at intervals, continue to add a cup of salt until the solution will no longer dissolve the new salt. A total of about six cups may be needed. Keep the container covered.
11. To use these fermented pickles in recipes, they will generally need to be soaked in water to remove the salt. Several changes of water during a 24-hour period is usually adequate. Use three or four parts of water to one part fermented cucumbers for each soaking.

Sweet Cucumber Pickles

Yield: about 4 pints.

½ gallon cucumbers (about 3 pounds)
6 cups of vinegar
3 cups of sugar
1 tablespoon pickling spices*

**Use 1 tablespoon cloves and 1 tablespoon ginger root in place of pickling spices, if desired.*

Remove cucumbers from brine and soak in water to remove salt as described above. Leave small pickling size cucumbers whole; larger ones may be cut into pieces.

Combine vinegar, sugar and spices (tied loosely in a cheesecloth bag). Bring mixture to boiling point, add drained cucumbers and boil 2 to 3 minutes.

Remove spice bag and pour into container. Allow to stand for three days. Each day, pour off liquid, bring to boiling point and pour over cucumbers.

Pack pickles in hot jars. Bring the same vinegar solution to boiling point and pour over pickles, leaving ½-inch

headspace; adjust lids and process in boiling waterbath at 212 degrees F for 15 minutes.

Sour Cucumber Pickles

Use recipe for Sweet Cucumber Pickles above except omit most or all of sugar.

Sweet Pickle Sticks

Yield: 7 to 9 pints.

8 pounds of 3- to 4-inch pickling cucumbers
⅓ cup canning or pickling salt
4½ cups sugar
3½ cups vinegar (5 percent)
2 teaspoons celery seed
1 tablespoon whole allspice
2 tablespoons mustard seed

These pickles may be canned as either strips or slices.
Wash cucumber and cut off 1/16 of blossomed end. Slice or cut into strips. Sprinkle with the a cup of salt. Cover with 2 inches of crushed or cubed ice. Refrigerate 3 to 4 hours. Add more ice as needed. Drain well.

Combine sugar, vinegar, celery seed, allspice and mustard seed in a 6-quart kettle. Heat to boiling.

Hot Pack: Add cucumbers and heat slowly until vinegar solution returns to boil. Stir occasionally to make sure mixture heats evenly. Fill sterile jars with cucumbers and cover with vinegar solution leaving ½-inch headspace. Adjust lids. Process in boiling waterbath canner, either pints or quarts, for 5 minutes.

Raw Pack: Fill jars, leaving ½-inch headspace. Add hot vinegar solution, leaving ½-inch headspace. Adjust lids and process in a boiling waterbath, pints for 10 minutes; quarts for 15 minutes.

Store jars of processed pickles four to five weeks to develop ideal flavor.

Fermented Dill Pickles

4 pounds pickling cucumbers, 3½ to 4 inches in length
2 teaspoons whole mixed pickling spices
4 to 5 heads fresh or dry dill weed or 2 tablespoons dill seed
¼ cup vinegar (5 percent)
½ cup pure granulated salt
8 cups water

Cover cucumbers with cold water. Wash thoroughly, using a vegetable brush, handling gently to avoid bruising. Take care to remove 1/16 inch off blossom end. Drain on rack or wipe dry.

Place half the pickle spices and a layer of dill in a 5-gallon crock or stone jar. Fill with cucumbers to 3 to 4 inches from top of crock. Place a layer of dill and remaining spices over the top of cucumbers. (Garlic may be added, if desired.) Thoroughly mix the vinegar, salt and water and pour over the cucumbers.

Cover with a heavy china or glass plate or lid that fits inside the crock.

Use a weight to hold the plate down and keep the cucumbers under the brine. A glass jar filled with water makes a good weight.* Cover loosely with a clean cloth. Keep pickles at room temperature and remove scum daily when formed. Scum may start forming in three to five days. Do not stir pickles, but be sure they are completely covered with brine. If necessary, make additional brine, using original proportions specified in recipe.

**Processing times given in these recipes are for altitudes of 1,000 feet or less. If you live at a higher altitude, add times given in Altitude Table on page 8.*

In about three weeks the cucumbers will have become an olive-green color and should have a desirable flavor. Any white spots inside the fermented cucumbers will disappear in processing. Discard if soft or slimy.

The original brine is usually cloudy as a result of bacteria and yeast development during the fermentation period. If this cloudiness is objectionable, fresh brine may be used to cover the pickles when packing them into jars. In making fresh brine, use ½ cup salt and 4 cups vinegar to 1 gallon of water. The fermentation brine is generally preferred for its added flavor. Strain brine, heat to boiling and simmer 5 minutes.

Pack the pickles, along with some of the dill, into clean, hot quart jars; add garlic if desired. Avoid too tight a pack. Cover with boiling brine to ½ inch from the top of the jar. Adjust jar lids.

Process in boiling waterbath canner for 15 minutes. Remove jars and set jars upright, several inches apart, on a wire rack to cool.

**A food quality polyethylene bag filled with 3 quarts of water and 4½ tablespoons of salt also makes a desirable covering. See step 4 on page 28.*

Quick Dill Pickles

Yield: 7 to 9 pints.

8 pounds fresh cucumbers, 3 to 5 inches in length
1¼ cups canning salt (divided)
2 gallons water
6 cups vinegar (1½ quarts)
¼ cup sugar
8 cups water (2 quarts)
3 tablespoons whole mustard seed (1 teaspoon per pint)
2 tablespoons mixed pickling spices
1½ teaspoons dill seed per pint*

** 1½ head of dill per pint may be substituted for dill seed.*

Wash and drain cucumbers. Cut off 1/16 inch of blossom end and discard. Make a brine of ¾ cup salt and the 2 gallons of water and pour over cucumbers. Let stand 12 hours. Drain.

Combine vinegar and remaining ½ cup of salt, ½ cup sugar, 2 quarts water and pickling spices (tied in thin white cloth).

Heat mixture to boiling. Pack cucumbers into clean hot jars; add mustard and dill seed to each jar. Cover with boiling vinegar solution to within ½ inch of top of jar. Adjust jar lids. Process in boiling waterbath – pints 10 minutes; quarts 15 minutes.

Dilled Green Beans

4 pounds green beans, whole (about 4 quarts)
Hot red pepper, crushed (¼ teaspoon per pint jar)
Whole mustard seed (½ teaspoon per pint jar)
Dill seed (½ teaspoon per pint jar)
Garlic (1 clove per pint jar)
5 cups vinegar
5 cups water
½ cup salt

Wash beans thoroughly; drain and cut into lengths to fill pint jars. Pack beans into clean, hot jars; add pepper, mustard seed, dill seed and garlic.

Combine vinegar, water and salt; heat to boiling. Pour boiling liquid over beans, filling to ½ inch from top of jar. Adjust lids.

Process in boiling water for 5 minutes (start to count processing time as soon as water in canner returns to boiling). Remove jars and set jars upright, several inches apart, on a wire rack to cool.

Cauliflower Pickles

Yield: 5 pints

3 quarts cauliflower florets (about 3 medium heads)
2 cups sliced onion
1 cup sweet red pepper strips
¼ cup salt
2 quarts ice cubes (2 trays)
1 quart white vinegar
2 cups sugar
1 tablespoon mustard seed
1 tablespoon celery seed
1 teaspoon turmeric
1 hot red pepper pod

Wash cauliflower; divide into florets. Combine cauliflower, sliced onion and red pepper strips; add salt. Cover with ice and let stand 3 to 4 hours. Drain well.

Combine remaining ingredients. Bring to a boil. Add vegetables; boil 10 minutes or until vegetables are tender-crisp.

Remove hot red pepper from vegetable mixture. Pour hot vegetables into hot pint jars. Cover with boiling vinegar mixture to ½ inch from jar top. Cut hot red pepper into five pieces and add one piece to each jar. Adjust lids.

Process in boiling water for 10 minutes. Remove jars. Set jars upright on a wire rack or folded towel to cool, placing them several inches apart.

Bread and Butter Pickles

Yield: 8 pints.

4 quarts cucumber, medium size (about 6 pounds), sliced
8 cups onions, thinly sliced (about 3 pounds)
2 large garlic cloves
½ cup canning or pickling salt
1-2 quarts (2 trays), ice, crushed or cubes
4½ cups sugar
1½ teaspoons turmeric
1½ teaspoons celery seed
2 tablespoons mustard seed
4 cups vinegar (5 percent)

Wash cucumbers thoroughly, using a vegetable brush; drain on rack. Slice unpeeled cucumbers into 3/16 inch slices. Add onions and garlic. Add salt and mix thoroughly. Cover with crushed ice or ice cubes; refrigerate for 3 hours, adding more ice as needed. Drain and remove garlic.

Combine sugar, spices and vinegar; heat to boiling and boil 10 minutes. Add cucumbers and onion slices and heat to boiling. Fill hot jars with slices and cooking syrup. Adjust lids. Process in boiling waterbath canner (212 degrees F) for 10 minutes. Start to count processing time as soon as the water in canner returns to boiling.

Pickled Beets

Yield: 6 pints

3 quarts beets, sliced (about 7 pounds without tops)
1 tablespoon allspice, whole
2 cinnamon sticks
2 cups sugar
1½ teaspoons salt
3½ cups vinegar
1½ cups water

Wash beets. Leave 2-inch stem and taproots. Cover with boiling water and cook whole until tender.

Drain; peel and slice.

Loosely tie allspice and cinnamon sticks in a clean, thin, white cloth. Combine sugar, salt, vinegar and water, add spice bag. Bring to a boil. Add beets, bring to a boil and boil 5 minutes.

**Processing times given in these recipes are for altitudes of 1,000 feet or less. If you live at a higher altitude, add times given in Altitude Table on page 8.*

Remove spice bag. Pack beets into hot pint jars. Cover with hot cooking liquid, filling to ½ inch from top. Adjust jar lids. Process pints or quarts in boiling waterbath for 30 minutes. Set jars upright on a wire rack or folded towel to cool, placing them several inches apart.

Pearl Onion Pickles

Yield: 7 pints.

4 quarts small onions
1 cup salt
2 cups sugar
2 tablespoons prepared horseradish*
3-4 tablespoons mustard seeds
2 quarts vinegar (white vinegar will help to retain white color)
7 small hot, red peppers
7 small bay leaves

** 3½ tablespoons of mixed pickling spices may be substituted for the horseradish and mustard seed.*

Select fresh tender onions, cover with boiling water and let stand for 2 minutes. Drain; dip at once into cold water and peel. Sprinkle onions with salt and add cold water to cover (about 2 quarts water to 1 cup salt). Let stand at least 12 hours or overnight. Drain off salt water; rinse and drain thoroughly. Combine sugar, horseradish, mustard seed and vinegar. Simmer 15 minutes.

Pack onions into jars, leaving ¼-inch headspace. To each jar, add 1 bay leaf and 1 pepper. Pour boiling hot vinegar mixture over onions; adjust lids according to manufacturer's directions. Process pints for 10 minutes in boiling waterbath.

Pickled Okra

3 pounds small tender okra
½ cup plain salt
4 cups vinegar (5 percent)
1 tablespoon mustard seed
1 cup water
6 pods hot pepper
6 garlic buds

Wash okra, pack in hot clean pint jars. Add 1 pepper and 1 garlic bud to each jar. Heat salt, vinegar, mustard seed and water to boiling. Cover okra with hot mixture. Adjust lids. Process in boiling waterbath (212 degrees F) for 10 minutes. Remove jars from canner.

Pickled Peaches

Yield: 5 quarts.

5 quarts peeled peaches
6½ cups sugar
1 quart cider vinegar
1¼ teaspoon mixed pickling spices
10 cloves
5 small pieces stick cinnamon

Use firm, ripe peaches such as Hiland, Cardinal, Dixie Red and Cornet. Make a syrup of 6½ cups of sugar and 1 quart of cider vinegar. Heat and add peeled peaches. Let fruit and syrup simmer for 10 minutes. To each jar add: ¼ teaspoon of mixed pickling spices, 2 cloves and 1 small piece of stick cinnamon. Add hot fruit to jar, cover with hot syrup, adjust the lid. Process in boiling waterbath for 25 minutes. Let peaches "season" at least one week; for best flavor, wait 6 weeks.

Pickled Pears

4 quarts pears
2 quarts sugar
1 pint water
1 quart cider vinegar
2½ sticks cinnamon
2 tablespoons whole allspice

Wash pears, peel, cut in half or quarters and core. Boil pears in a covered vessel in 1 pint of water for 10 minutes. Tie spices loosely in a thin cloth bag. Combine water that the pears were cooked in, sugar, vinegar and spices and heat to boiling. Pour over pears and let stand overnight in a covered vessel. Drain and boil syrup until thick. Add pears and cook until tender. Do not stir, but keep pears under syrup. Pack into hot jars and cover with syrup. Process in a boiling waterbath canner (212 degrees F) for 10 minutes. Yield: about 8 pints. If Kieffer pears are to be used, best results are obtained if pears are gathered about ⅔ or ¾ mature. The best stage appears to be when the green in immature fruit gradually fades and the fruit becomes lighter or slightly yellow. Spread out in a cool (about 60-65 degrees F), dry place for about 2 weeks. The pear will have a better flavor and texture. Proceed as the recipe directs.

Quick Party Pickles

1 quart commercial dill pickles
1 quart commercial sour pickles

Drain pickles and slice (or you may buy the hamburger dills). Put in 2½ quart jar and add alternate layers of pickles and the following mixture:

4 cups of sugar
2 tablespoons whole allspice
2 or more cloves of garlic, sliced

These pickles will make their own syrup. Store in refrigerator.

Pickled Peppers

Yield: about 8 pints.

4 quarts pepper, Banana, Hungarian or other
10 cups vinegar
2 cups water

Cut two small slits in each pepper and cover with a salt brine (1½ cups salt in 1 gallon water). Let stand overnight in a cool place. Drain; rinse and drain. Combine 10 cups of vinegar with the 2 cups water; bring to boiling temperature and boil gently for 10 to 15 minutes. Pack peppers into hot jars, leaving ½-inch headspace. Cover with the hot pickling solution. Adjust lids and process in boiling waterbath – half pints 10 minutes; pints 10 minutes.

Variations: Add to Pickled Peppers recipe one or more of the following:

- 1 to 2 tablespoons prepared horseradish
- 1 head of dill
- 1 to 2 cloves of garlic (remove before packing into jars)
- 2 to 3 tablespoons sugar

Green Tomato Pickles

Yield: about 9 pints.

1 gallon (16 cups) sliced tomatoes
2 cups sliced onions
¼ cup canning or pickling salt
4 cups vinegar (5 percent)
3 cups brown sugar
1 tablespoon whole cloves
1 tablespoon allspice
1 tablespoon celery seed
1 tablespoon mustard seed

Slice tomatoes and onions thin. Sprinkle with ¼ cup salt and let stand 4 to 6 hours. Drain; heat and stir sugar into vinegar until dissolved. Tie cloves, allspice, celery and mustard seed in a cheesecloth or spice bag. Add to vinegar with tomatoes and onions. Bring to boil, reduce heat and simmer 30 minutes, stirring as needed to prevent scorching. Tomatoes should be tender and transparent when properly cooked. Remove spice bag. Fill jars and cover with vinegar solution. Leave ½-inch headspace. Adjust lids and cover with vinegar solution. Adjust lids and process in boiling waterbath canner – pints 10 minutes; quarts 15 minutes.

Corn Relish

Yield: about 9 pints.

10 cups fresh whole kernel corn (16 to 20 medium-size ears) or six 10-ounce packages of frozen whole kernel corn
2½ cups diced sweet red pepper (4 to 5 medium)
2½ cups diced sweet green pepper (4 to 5 medium)
2½ cups chopped celery
1¼ cups diced onions (8 to 10 small)
1¾ cups sugar
5 cups vinegar
2½ tablespoons canning or pickling salt
2 teaspoons dry mustard
1 teaspoon turmeric

Fresh corn: Remove husks and silks. Cook ears of corn in boiling water for 5 minutes; remove and plunge into cold water. Drain; cut corn from cob. Do not scrape cob.

Frozen corn: Defrost overnight in refrigerator.

Combine peppers, celery, onions, sugar, vinegar, salt and celery seed. Cover pan until mixture starts to boil, then boil uncovered for 5 minutes, stirring occasionally. Mix dry mustard and turmeric and blend with liquid from boiling mixture; add, with corn, to boiling mixture. Return to boiling and cook for 5 minutes, stirring occasionally.

Fill jars loosely with mixture while boiling hot into clean, hot half pint or pint jars, filling to ½ inch from top. Adjust lids. Process in hot waterbath for 15 minutes (start to count processing time as soon as water in canner returns to boiling). Remove jars and set jars upright, several inches apart, on a wire rack to cool.

Piccalilli or Chow Chow

Yield: 3 pints.

1 quart chopped green tomatoes
1 cup chopped red sweet pepper
1 cup chopped green pepper
1 ½ cup chopped onion
5 cups (about 2 pounds) chopped cabbage
⅓ cup salt
3 cups vinegar
2 cups brown sugar, packed
2 tablespoons whole mixed pickling spice

Combine vegetables, mix with salt and let stand overnight. Drain and press in a clean, thin, white cloth to remove all liquid possible.

Combine vinegar and sugar. Place spices loosely in a clean cloth; tie with a string. Add to vinegar mixture. Bring to boil.

Add vegetables, bring to boil, and boil gently about 30 minutes, or until mixture is reduced one-half in volume.

Remove spice bag. Pack hot relish into clean, hot pint jars.

Fill jars to ½ inch from top. Adjust lids.

Process in boiling waterbath for 5 minutes.* Remove jars. Set jars upright on wire rack or folded towel to cool, placing them several inches apart.

Tomato Apple Chutney

3 quarts tomatoes, pared and chopped
3 quarts apples, pared and chopped
2 cups raisins, seedless, white
2 cups chopped onions
1 cup chopped green pepper (2 medium)
2 pounds brown sugar
1 quart white vinegar
4 teaspoons salt
1 teaspoon ground ginger
¼ cup whole pickling spices

Combine all ingredients except the whole spices. Tie spices loosely in a clean cloth and add to tomato apple mixture. Bring to a boil; cook slowly, stirring frequently until mixture is thickened (about 1 hour). Remove spice bag. Pack the boiling hot mixture into hot pint jars to within ½ inch from top of jars. Adjust lids and process in boiling waterbath for 5 minutes.* Start counting processing time when water in canner returns to boiling.

Sauerkraut

Yield: about 9 quarts.

25 pounds of cabbage
¾ cup salt, pure granulated (canning salt)

When making kraut in smaller quantities, allow 2 pounds of shredded cabbage and 4 level teaspoons of salt for each quart.

Remove the outer leaves and any undesirable portions from the firm, mature heads of cabbage; wash and drain. Cut into halves or quarters; remove the core. Use a shredder or sharp knife to cut the cabbage into thin shreds, about the thickness of a quarter.

In a large container, thoroughly mix 3 tablespoons salt with 5 pounds shredded cabbage. Let the salted cabbage stand for several minutes to wilt slightly. This allows packing without excessive breaking or bruising of the shreds.

Pack the salted cabbage firmly and evenly into a large clean crock or jar. Using a wooden spoon or tamper, press down firmly until the juice comes to the surface. Repeat the shredding, salting and packing of cabbage until the crock is filled within 3 to 4 inches of the top. Juice should cover cabbage. Add boiled and cooled brine if needed (2 tablespoons salt to one quart of water).

Cover cabbage with a clean, thin, white cloth (such as muslin) and tuck the edges down against the side of the container. Cover with a plate or round paraffined board that just fits inside the container so the cabbage is not exposed to the air. Put a weight on top of the cover so the brine comes to the cover but not over it. A glass jar filled with water makes a good weight.

A newer method of covering cabbage during fermentation consists of placing a plastic bag filled with brine (4½ tablespoons of salt to 3 quarts of water) on top of the fermenting cabbage. The brine-filled bag seals the surface from exposure to air, and prevents the growth of film yeast or molds. It also serves as a weight. For extra protection, the bag with the water in it can be placed inside another plastic bag.

Any bag used should be of heavy-weight, water-tight plastic and intended for use with foods.

The amount of water in the plastic bag can be adjusted to give just enough pressure to keep the fermenting cabbage covered with brine.

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Formation of gas bubbles indicates fermentation is taking place. If jars are used as weights, check kraut 2 or 3 times each week to remove scum if it forms. A room temperature of 68 to 72 degrees F is best for fermenting cabbage. Fermentation is usually completed in 4 to 6 weeks.

Hot Pack: Heat kraut and liquid slowly to a boil in a large kettle. Pack hot sauerkraut into clean, hot jars and cover with hot juice to ½ inch from top of jar. Adjust jar lids. Process in boiling waterbath – 10 minutes for pints and 15 minutes for quarts.

Remove jars. Cool upright. Two-piece lids do not need further tightening.

Watermelon Pickles

Yield: 4 to 5 pints.

3 quarts watermelon rind
¾ cup salt
3 quarts water
2 trays ice cubes
9 cups sugar
3 cups vinegar, white
3 cups water
1 tablespoon whole cloves
6 1-inch pieces stick cinnamon
1 lemon, thinly sliced, with seed removed

Pare rind and all pink edges; cut into 1-inch pieces. Cover with brine made by mixing the salt with 3 quarts of water. Add ice cubes. Let stand 5 or 6 hours.

Drain; rinse in cold water. Cover with cold water and cook until fork-tender, about 10 minutes (do not overcook). Drain.

Combine sugar, vinegar, 3 cups water and spices (tied in thin white cloth); boil 5 minutes and pour over rind with spices; add lemon slices. Let stand overnight.

Heat rind in syrup to boiling and cook until translucent (about 10 minutes). Pack hot pickles loosely into clean, hot pint jars. Add 1 stick cinnamon from spice bag to each jar; cover

with boiling syrup to ½ inch from top of jar. Adjust lids. Process in boiling waterbath 5 minutes.*

Chili Sauce

Yield: 5 pints.

2 gallons large ripe tomatoes
6 green peppers
1½ pints vinegar
2 tablespoons cinnamon
1 tablespoon mustard
6 large onions
1 cup brown sugar
2½ tablespoons salt
1 tablespoon ginger
2-3 teaspoons nutmeg

Peel, core and slice tomatoes. Chop the onions and peppers. Put into a large kettle. Add other ingredients. Cook on top of the range, stirring frequently, until sauce reaches the consistency of ketchup (about 4 hours). Fill pint jars with hot sauce. Leave ½-inch headspace. Process in a boiling waterbath canner for 15 minutes.

Tomato Catsup

Yield: 3 pints.

1 gallon chopped ripe tomatoes, (peeled)
2 medium onions, chopped
1 cup chopped red peppers
2 tablespoons salt
4 tablespoons sugar
1 tablespoon mustard, powdered
1 teaspoon whole allspice
1 teaspoon whole cloves
3 2-inch sticks cinnamon
2 cups vinegar

Cooked chopped vegetables until tender; about 30 minutes. Press through a fine sieve. Add spice, tied in a bag, to the pulp and heat slowly.

Cook 1½ hours, or until slightly thick. Remove spice bag. Add vinegar and cook until desired thickness. Pour into hot pint jars. Leave ½-inch headspace. Process in a boiling waterbath canner (212 degrees F) for 15 minutes.

Onion Pepper Relish

6-8 large onions, finely chopped (1 quart)
4-5 medium sweet red peppers, finely chopped (1 pint)
4-5 medium green peppers, finely chopped (1 pint)
1 cup sugar
1 quart vinegar
4 teaspoon salt

Combine all ingredients and bring to a boil. Cook until thickened and reduced about one-half in volume (about 45 minutes), stirring occasionally.

Pack the boiling hot relish into clean, hot pint jars to ½ inch from top of jar, adjust lids. Process in boiling waterbath for 10 minutes (start to count processing time when water in canner returns to boiling).*

Remove jars and set upright, several inches apart, on a wire rack to cool.

Bread and Butter Pickled Squash

Yield: about 7 pints.

1 gallon (4¼ pounds) sliced squash (yellow) or zucchini
2 green bell peppers, diced
5 medium onions, diced
½ cup salt
5 cups vinegar
4½ cups sugar
1 teaspoon ground mustard
1½ teaspoons turmeric
1 teaspoon celery seed
20 whole cloves

**Processing times given in these recipes are for altitudes of 1,000 feet or less. If you live at a higher altitude, add times given in Altitude Table on page 8.*

Cut squash into ¼-inch slices and combine with peppers and onions. Cover with ½ cup salt; let stand 3 hours. Drain.

Mix vinegar with sugar and spices; heat mixture to boiling temperature. Fill pint jars with squash and cover with boiling vinegar solution. Leave ½-inch headspace.

Adjust lids; place in boiling waterbath and hold 10 minutes.* Begin counting time as soon as all jars are in boiling waterbath.

Hot Squash Relish

Yield: about 7 pints.

4 pounds (7 quarts) diced squash
2 cups diced green bell peppers
1 large bunch celery (1 quart) diced
1 cup diced onion
1½ cups sugar
4 cups vinegar
2 tablespoons salt
2 teaspoons celery seed
3 hot peppers, medium size*
2 tablespoons powdered mustard
1 teaspoon turmeric

**One-fourth to one-half teaspoon crushed red peppers to each pint of vegetables may be substituted for hot peppers. Start with one-fourth teaspoon and add as desired.*

Prepare vegetables, discarding leaves from celery.

Combine peppers, celery and onion with vinegar, sugar, salt, celery seed and 3 pods of hot pepper.** Heat mixture to boiling and boil 5 minutes. Stir in squash, mustard and turmeric. Return to boiling and boil 5 minutes.

Spoon into clean pint jars; adjust lids. Place jars in boiling water to cover, boil 15 minutes. Begin counting time as soon as all jars are in boiling waterbath.

***Add 2 pods of hot pepper, heat mixture, taste for hotness and add the third pod of pepper if desired.*

Sweet Squash Relish

Follow recipe for making hot relish, but decrease amount of hot pepper. Use about ½ to 1 pod of hot pepper, or just enough to give desired flavor.

Fresh Pack Pickle Squash

Yield: about 6 pints.

5 pounds (1⅛ gallon) squash
⅓ cup salt
1 cup water
4 cups vinegar

Cut squash into ¼-inch slices; combine with salt. Let stand for 1 hour; drain. Pack drained squash into jars. Mix vinegar with water; heat to boiling temperature. Cover squash with the boiling vinegar solution.

Adjust lids; process pint jars in boiling waterbath for 5 minutes.

Start to count processing time as soon as the water in canner returns to boiling temperature.

Variation: To vinegar and water solution, add 2 cups sugar and heat to boiling temperature. Proceed as given above.

No-Sugar-Added Pickled Products

No-Sugar-Added Sweet Cucumber Slices

Yield: about 4 or 5 pint jars.

3½ pounds of pickling cucumbers
boiling water to cover sliced cucumbers
4 cups cider vinegar (5 percent)
3 cups Splenda®
1 tablespoon canning salt
1 cup water
1 tablespoon mustard seed
1 tablespoon allspice
1 tablespoon celery seed
4 one-inch cinnamon sticks

Wash and rinse pint canning jars; keep hot until ready to use. Prepare lids according to manufacturer's directions.

Wash cucumbers. Slice 1/16 inch off the blossom ends and discard. Slice cucumbers into ¼ inch thick slices. Pour boiling water over the cucumber slices and let stand 5 to 10 minutes. Drain off the hot water and pour cold water over the cucumbers. Let cold water run continuously over the cucumber slices, or change water frequently until cucumbers are cooled. Drain slices well.

Mix vinegar, 1 cup water, Splenda® and all spices in a 10-quart Dutch oven or stockpot. Bring to a boil. Add drained cucumber slices carefully to the boiling liquid. Return to a boil.

Place one cinnamon stick in each jar, if desired. With a slotted spoon, fill hot pickle slices into clean, hot pint jars, leaving ½ inch at top to allow for headspace. Cover with boiling hot pickling brine with ½ inch headspace. Remove air bubbles and adjust headspace if needed. Wipe rims of jars with a dampened clean paper towel; apply two-piece metal canning lids. Process in a boiling water canner for 10 minutes.

Scorecard for Judging Pickles, Catsup, Chow-Chow and Relish

	Pickles	Catsup	Chow-Chow and Relish	*Excellent*	*Good*	*Fair*	*Needs Improving*
Color	Natural except for spices – no artificial color	Deep tomato red	Natural except for spice – no artificial color	☐	☐	☐	☐
Flavor	Pleasing – in keeping with ingredients used	Pleasing – in keeping with ingredients used	Pleasing – in keeping with ingredients used	☐	☐	☐	☐
Texture	Crisp and tender	Smooth and thick	Vegetables cut fine and fairly uniform	☐	☐	☐	☐
Container	Standard Mason™ jar – clean and neatly labeled	Standard Mason™ jar – clean and neatly labeled	Standard Mason™ jar – clean and neatly labeled	☐	☐	☐	☐

Pickle Troubles and What Causes Them

Problem	*Cause*
Soft slippery pickles	• failure to remove 1/16 inch of blossom • cucumbers exposed above the brine • vinegar or brine too weak • precooked at too high temperature (overcooked)
Shriveled pickles	• salt solution too strong • too much sugar • vinegar solution too strong
Hollow pickles	• faulty development of the cucumber • excessive delay in placing cucumbers in brine
Effect of scum	• spoilage from top layer of cucumbers or cabbage will occur unless the scum (yeasts, molds and bacteria) is frequently removed • scum may also weaken the acidity of the brine and cause spoilage
Black spots	• iodine in the salt • iron in the water
Darkened pickles	• use of hard water • using ground spices • leaving spices in the jar • storing pickles in a light place – especially peaches

JAMS, JELLIES AND PRESERVES

Jams, jellies and preserves are similar in that they all contain sugar and fruit or fruit juice.

Jam is made from crushed fruit and is less firm than jelly.

Jelly is a clear, tender gel made from fruit juice, yet firm enough to hold its shape when cut.

Preserves are small whole fruit or large pieces of fruit in a thick syrup.

Ingredients

To make a jellied fruit product, four basic ingredients are needed:

Fruit furnishes flavor, color and part or all of the acid and pectin necessary for successful gels. Apples, crab apples, blackberries, grapes and plums, when slightly underripe, contain enough pectin, acid and flavor for successful jelly making. These fruits may be combined with fruits that contain smaller amounts of pectin and acid.

Pectin occurs naturally in fruit; some fruits have enough to make high-quality products. Other fruits require added pectin for making jellies. Commercial fruit pectins made from apples or citrus fruits are available in liquid or powder form and may be used with any fruit. The use of commercial pectin* shortens the cooking time, permits use of fully ripe fruit and insures a greater yield from a given amount of fruit.

Acid is higher in underripe than in fully ripe fruits and is necessary for flavor and for gel formation. Lemon juice is frequently added to fruits that are low in acid.

Sugar helps in forming a gel, aids in firming fruit, acts as a preservative and gives flavor. Use either bean or cane sugar unless the recipe specifies other kinds.

**To make jams, jellies or preserves using commercial pectin, follow the recipes that are included with the pectin.*

Remaking Soft Jelly

To remake soft jellies without added pectin, add 2 tablespoons bottled lemon juice for each quart of jelly. Heat to boiling and boil for 3 to 4 minutes.

Recipes

Recipes in this publication contain proportions of ingredients suitable for making jams, jellies and preserves without the addition of commercial pectin.

Equipment

Select a large kettle, allow enough space for fruit or juice to bubble when boiling. Use standard measuring cups and spoons.

When making jelly, a cheesecloth or jelly bag will be needed to strain juice. Other equipment should include a long-handled spoon, ladle, paring knife, jelly or candy thermometer and bowls.

Containers

Use standard canning jars as containers for jams, jellies and preserves. Seal only with lids.

Wash glasses, jars and lids in warm soapy water and rinse. Sterilize jelly containers in boiling water for 10 minutes. To seal with lids, follow manufacturer's instructions for preparing the flat metal lid that is held in place by a screw band.

Processing Jams, Jellies and Preserves in a Waterbath

To prevent mold growth and to make a firm seal, process all jams, jellies and preserves in a boiling waterbath. Follow directions for use of canner on pages 7 and 8.

Paraffin

Sealing with paraffin is no longer recommended.

Selecting Fruit for Jelly Making

Select about one-fourth underripe fruit and three-fourths ripe fruit. When all fruit is fully ripe, for best results, use a commercial pectin and follow manufacturer's directions.

Extracting Juice

Wash fruits in cold water, lifting them out of water after each washing. Do not leave fruit standing in water. Discard damaged parts; remove stems and blossom ends. Cut large fruits into pieces. Crush berries and grapes.

Pour hot fruit into a damp jelly bag or one made from unbleached muslin, or two layers of closely woven cheesecloth. For clear jelly, allow juice to drip through without pressing, but for a greater yield, press or twist bag to extract juice. Straining the juice extracted by pressing or twisting will help to clarify it. Strain through muslin or cheesecloth.

Fruits Ranked as to Acid and/or Pectin Content

High Acid – High Pectin Fruits: Fruits containing sufficient acid and pectin for making jellied products include:

- Apples, tart varieties
- Gooseberries
- Blackberries, tart or underripe
- Grapefruit
- Crab apples
- Lemons
- Cranberries
- Plums, sour varieties
- Currants
- Grapes, sour varieties

High Pectin – Low Acid Fruits: Fruits containing sufficient pectin but low in acid:

- Apples, sweet varieties
- Quinces

High Acid – Low Pectin Fruits: Fruit containing sufficient acid but low in pectin:

- Apricots
- Strawberries
- Peaches, sour
- Rhubarb

JELLIES

General Directions for Making Jelly

1. Measure juice and sugar into a large container, large enough to prevent jelly from boiling over. Better results will be obtained if jelly is made in small quantities – about 3 to 4 cups of juice.
2. Place on hot unit and quickly bring to a rolling boil.
3. Test doneness. If a thermometer is used, bulb of the candy thermometer should be covered with the jelly mixture but must not touch bottom of the kettle. Gel stage is reached at about 8 degrees F (4 degrees C) above the boiling point of water. In most areas of Tennessee, this would be 220 degrees F (104 degrees C).*

If a spoon or sheet test is used, dip spoon into the boiling jelly mixture. Raise spoon 10 to 12 inches above the kettle and turn spoon until syrup runs off the side. If two drops form and drip off the spoon, syrup is near gel state. When the two drops flow together and fall off spoon as one sheet, the jelly should be done.

Another suitable home method is to pour a small amount of boiling jelly syrup on a cold dish and put into the refrigerator for a few minutes. If mixture gels, jelly should be done.

At higher elevations, gel stage may be reached at a lower temperature than 220 degrees F (212 degrees F + 8 degrees F), since moisture evaporates at boiling temperature even if boiling temperatures are lower than 212 degrees F. For example, at an altitude of 2000 feet, gel stage may be reached at 216 degrees F, and at 3000 feet, 214 degrees F.

Apple Jelly (without added pectin)

Yield: 3 to 4 half pints.

4 cups apple juice (about 3 pounds apples and 3 cups of water)
2 tablespoons strained lemon juice, if desired
3 cups sugar

To prepare juice: Select about one-fourth underripe and three-fourths fully ripe tart apples. Sort, wash and remove stem and blossom ends. Do not pare or core. Cut apples into small pieces. Add water, cover and bring to boil on high heat. Reduce heat and simmer for 20 to 25 minutes, or until apples are soft. Extract juice.

To make jelly: Measure apple juice into a kettle. Add lemon juice and sugar; stir well. Boil over high heat to 8 degrees F (4 degrees C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot containers. Adjust lids. Process in boiling waterbath for 5 minutes.

Blackberry Jelly (without added pectin)

Yield: 3 to 4 pints.

4 cups blackberry juice (about 2½ quarts blackberries, ¾ cup water)
3 cups sugar

To prepare juice: select about one-fourth underripe and three-fourths ripe berries. Sort and wash; remove any stems or caps. Crush berries, add water, cover and bring to a boil on high heat. Reduce heat and simmer for 5 minutes. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 degrees F (4 degrees C) above boiling point* of water or until jelly mixture sheets from a spoon.

**The boiling point of water in most areas of Tennessee is 212 degrees F (100 degrees C).*

Remove from heat; skim off foam quickly. Pour jelly immediately into containers. Adjust lids and process in boiling waterbath for 5 minutes.

Dewberry Jelly

Follow directions for making blackberry jelly.

Crab Apple Jelly

Yield: 5 half pints.

4 cups crab apple juice (about 3 pounds crab apples, 3 cups water)
4 cups sugar

To prepare juice: Select firm, crisp crab apples, about one-fourth underripe, the rest fully ripe. Sort, wash and remove stem and blossom ends; do not pare or core. Cut apples into small pieces. Add water, cover and bring to boil on high heat. Reduce heat and simmer for 20 to 25 minutes, or until crab apples are soft. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 degrees F (4 degrees C) above boiling point* of water or until jelly mixture sheets from a spoon. Remove from heat; skim off foam quickly. Pour jelly immediately into hot containers. Adjust lids and process in boiling waterbath for 5 minutes.

Grape Jelly

Yield: 3 to 4 half pints.

4 cups grape juice (about 3½ pounds Concord grapes, ½ cup water)
3 cups sugar

To prepare juice: Select about one-fourth underripe and three-fourths fully ripe grapes. Sort, wash and remove grapes from stems. Crush grapes, add water, cover and bring to boil on high heat. Reduce heat and simmer for 10 minutes. Extract juice.

To prevent formation of tartrate crystals in the jelly, let juice stand in a cool place overnight, then strain through two thicknesses of damp cheesecloth to remove crystals that have formed.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 degrees F (4 degrees C) above boiling point* of water or until jelly mixture sheets from a spoon.

Remove from heat; skim off foam quickly. Pour jelly immediately into hot containers. Adjust lids and process in boiling waterbath for 5 minutes.

Plum Jelly

Yield: 3 to 4 pints.

4 cups plum juice (about 3½ pounds plums and 1½ cups water)
3 cups sugar

To prepare juice: Select about one-fourth underripe and three-fourths fully ripe plums. Sort, wash and cut into pieces; do not peel or pit. Crush the fruit, add water, cover and bring to a boil on high heat. Reduce heat and simmer for 15 to 20 minutes, or until fruit is soft. Extract juice.

To make jelly: Measure juice into a kettle. Add sugar and stir well. Boil over high heat to 8 degrees F (4 degrees C) above boiling point of water or until mixture sheets from a spoon. Remove from heat, skim off foam quickly. Pour jelly immediately into hot containers. Adjust lids and process in boiling waterbath for 5 minutes.

**The boiling point of water in most areas of Tennessee is 212 degrees F (100 degrees C).*

JAMS

To distribute fruit through syrup in the finished product, stir mixture gently at frequent intervals, often removing it from the heat. This helps prevent fruit from rising to the top.

In testing jams for doneness, cook mixture to a temperature of 9 degrees F (4 degrees C) above the boiling point* of water. Or, use the refrigerator test suggested for jelly on page 38. When jam has partially thickened, allow for additional thickening as it cools.

Blackberry Jam

4 cups crushed blackberries
4 cups of sugar

To prepare fruit: Sort and wash berries; remove any stems and caps. Crush berries.

To make jam: Measure crushed blackberries into a kettle. Add sugar and stir well. Boil rapidly, stirring constantly or until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Pour into hot jars; adjust lids. Process in boiling waterbath 5 minutes. Yield: 4 to 5 half-pint jars.

Peach Jam

Yield: 4 to 5 half-pint jars.

4 cups crushed peaches (tart variety)
3¼ cups sugar

Combine crushed fruit and sugar. Heat slowly in a heavy saucepan until boiling. Boil rapidly until thickened, about 15 minutes. Stir frequently during cooking to prevent sticking. Pour hot jam into hot jars; adjust lids and process into boiling waterbath – pints: 10 minutes; quarts:10 minutes.

Plum Peach Jam (without added pectin)

Yield: 9 half-pint jars.

5 cups red plums (about 3 pounds)
4 cups peaches (about 3 pounds)
8 cups sugar
1 lemon (sliced very thin)

To prepare fruit: sort and wash fruit. Peel and pit peaches; pit plums. Cut fruit into small pieces.

To make jam: Measure the prepared fruit into a kettle. Add sugar and sliced lemon; stir well. Boil rapidly, stirring constantly, until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Fill hot jars. Adjust lids and process in boiling waterbath for 5 minutes.

Strawberry Jam

Yield: 4 to 5 half-pint jars.

4 cups crushed strawberries (about 2 quarts)
4 cups sugar

To prepare fruit: Sort and wash strawberries; remove stems and caps. Crush the berries.

To make jam: Measure crushed strawberries into a kettle. Add sugar and stir well. Boil rapidly, stirring constantly, or until mixture thickens.

Remove from heat; skim and stir alternately for 5 minutes. Pour into hot jars. Adjust lids and process in boiling waterbath 5 minutes.

**If you live at an altitude above 1,000 feet, processing times for these recipes are given in the Altitude Table on page 8.*

PRESERVES

Select firm ripe fruit of uniform size and shape. Or, cut large fruit into uniform pieces. During cooking, stir fruit mixture gently and constantly to prevent sticking to pan.

In testing preserves for doneness, use the same methods given for jams, page 40.

Cherry Preserves

Yield: 6 half-pint jars.

1½ quarts pitted cherries
5½ cups sugar
1 cup water

To prepare fruit: Wash, sort and pit cherries.

To make preserves: Dissolve the sugar in water; bring to boil. Add cherries and boil, stirring gently until fruit is translucent and syrup is thick.

Remove from heat. Fill hot jars; adjust lids and process in boiling waterbath for 5 minutes.

Peach or Pear Preserves

Prepare fruit, cutting into uniform pieces. Use 1 pound of prepared fruit to ¾ pound sugar. Combine sugar with enough water to make a thin syrup. Add 1 lemon, thinly sliced, to fruit mixture if desired. Follow directions for making strawberry preserves.

Damson Plum Preserves

Yield: 6 half-pint jars.

1½ quarts prepared Damson plums (about 3 pounds)
5½ cups sugar
1 cup water

To prepare fruit: Sort and wash plums; remove pits with pitting spoon, leaving plums whole.

To make preserves: Dissolve the sugar in the water and bring to boiling. Add plums and boil, stirring gently until the fruit is translucent and the syrup is thick.

Remove preserves from the heat and pour at once into hot jars. Adjust lids and process in boiling waterbath for 5 minutes.

Strawberry Preserves

Yield: 4 half-pint jars.

6 cups prepared strawberries (about 2 quarts berries)
4½ cups sugar

To prepare fruit: Select large, firm, tart strawberries. Wash and drain; remove caps.

To make preserves: Combine prepared fruit and sugar in alternate layers and let stand for 8 to 10 hours, or overnight, in the refrigerator or other cool place.

Heat the fruit mixture to boiling, stirring gently. Boil rapidly, stirring as needed to prevent sticking. Cook until the syrup is somewhat thick (about 15 or 20 minutes).

Removes preserves from heat and skim. Pour into hot jars; adjust lids and process in boiling waterbath for 5 minutes.

Processing Times for Jams, Jellies and Preserves

Boiling Water Bath
Processing Time Depends on Altitude

Processing times recommended in this publication are correct for much of the state except in high elevations. For these high areas, add processing time given in the Altitude Table below. Learn the altitude in your area. Consult with your Extension agent or local district soil conservationist.

At Altitudes:

0-1000 ft.	*1001-6000 ft.*	*Above 6000*
Use time given for specific recipe in this publication (see recipes)	Add 5 minutes to time given for specific recipes.	Add 10 minutes to time given for specific recipes.

Uncooked Jams

Blackberry or Strawberry Jam Uncooked

Yield: 5 to 6 half-pint jars.

2 cups crushed strawberries or blackberries
4 cups sugar
1 package powdered pectin
1 cup water

Sort, wash and drain berries. Remove caps and crush.

Mix sugar and berries in a large bowl; let stand for 20 minutes. Stir occasionally.

Dissolve pectin in water and bring to a rolling boil. Boil 1 minute. Add hot solution to berry and sugar mixture; stir until thoroughly mixed.

Pour jam into freezer containers or jars to ½ inch from top of container. Cover and let stand at room temperature for 24 hours. Store in refrigerator or freezer. If jam separates, stir to blend. If jam is too soft, heat to boiling temperature. Jam will thicken on cooling.

Uncooked jam may be held in the refrigerator for 3 weeks and in the freezer for a year.

Uncooked jam held at room temperature will become moldy or ferment.

Fruit Butters

Fruit butters are made by cooking the pulp of fruit, usually with sugar and spices, until thick and smooth but soft enough to spread.

Apple Butter

Wash fruit, remove stems and blossom ends and cut in quarters. Add one third to one half as much water* as fruit. Cook apples until soft. Put through a colander, food mill or sieve.

Combine pulp with sugar, using 2 cups pulp to 1 cup sugar. Add spices as desired. Cook mixture slowly, stirring frequently until thick – about 1 to 1½ hours.

Pour hot butter into hot jars, leaving ½-inch headspace. Adjust caps and process in boiling waterbath – pints 10 minutes; quarts 10 minutes. If you live at an altitude above 1,000 feet, check the Altitude Table above.

Peach Butter

Wash peaches, scald, peel, pit and slice. Cook in own juice or add just enough water to prevent sticking.

Follow recipe for making apple butter, but cook mixture for about 30 minutes or until thick.

Pear Butter

Follow recipe for preparing apple butter.

**Sweet cider may be used in place of water if desired.*

Scorecard for Judging Jellies, Jams, Preserves & Fruit Butters

	Jellies	Jams	Preserves	Butters	*Excellent*	*Good*	*Fair*	*Needs Improving*
Color	Clear, translucent, natural color of fruit juice	Natural color of fruit – somewhat darker than preserves	Translucent jelly with whole or large pieces of fruit – natural color	Natural color of fruit except spices	☐	☐	☐	☐
Flavor	Natural for product delicate flavor	Rich flavor natural for product	Rich flavor natural for product	Natural for product and spices	☐	☐	☐	☐
Texture	Tender, cuts easily, holds shape – not tough or sticky	Tender, thick consis-tency, fruit uniformly distributed	Tender, thick consis-tency; fruit uniformly distributed	Smooth, medium thick	☐	☐	☐	☐
Container	Jelly glasses or canning jars, clean and neatly labeled	Standard Mason™ jar – clean and neatly labeled	Standard Mason™ jar – clean and neatly labeled	Standard Mason™ jar – clean and neatly labeled	☐	☐	☐	☐

Common Problems with Jam, Jelly and Preserves	
Problem	*Cause*
Jelly soft, does not hold shape	• too much juice in proportion to sugar • juice low in acid • insufficient cooking time
Weeping of jelly (syneresis)	• juice mixture contains too much acid • storage place too warm
Fermentation of jelly (syneresis)	• not enough sugar in proportion to ice • improper seal (not airtight)
Jelly too firm	• too much pectin • overcooking
Tough jelly	• not enough sugar in proportion to juice resulting in overcooking
Mold on jam or jelly	• improper seal allows mold to enter container
Crystals in jelly	• too much sugar for amount of juice • too little cooking after adding sugar • jelly exposed to air – causing formation of crystals on top due to evaporation of liquid • crystals on grape jelly may be tartrate crystals (see page 40)
Cloudy jelly	• improper extraction of juice – pressing juice from fruit instead of letting it drip • using green fruit (underripe) in preparing juice
Excessive shrinking of preserves	• syrup too heavy for fruit used – juice drawn out of fruit much faster than syrup enters fruit

Metric Conversion Table		
TO CHANGE:	TO:	MULTIPLY BY:
ounces (oz.)	grams (g)	28
pounds (lbs.)	kilograms (kg)	0.45
teaspoons	milliliters (ml)	5
tablespoons	milliliters (ml)	15
fluid ounces	milliliters (ml)	30
cups	liters (1)	0.24
pints (pt.)	liters (1)	0.47
quarts (qt.)	liters (1)	0.95
gallons (gal.)	liters (1)	3.8
Temperature		
Fahrenheit temperature (F)	Celsius temperature (C)	5/9 after subtracting 32

Definition of Preservation Terms	
Bacteria	Microorganisms (invisible to naked eye) are always present in the air, soil and water.
Blanching	Heating a food in boiling water or steam a given length of time.
Brining	A curing process using salt. For pickles or kraut, salt is combined with the raw food and cured (fermented) for about three to five weeks.
Clostridium botulinum	A spore-forming bacterium that is capable of producing a poisonous toxin under certain conditions if the spore is not destroyed. These bacteria do not grow in air. High acid content of foods also deters their growth. But these bacteria, if not destroyed, grow well in closed jars of low-acid foods.
Enzymes	Enzymes are chemical substances found in all animals and plants. Enzymes in foods help them grow and mature. After maturity, continued activity of enzymes cause loss of flavor and color if they are not destroyed or inactivated.
Fermentation	See brining.
Microorganisms	Organisms invisible without the use of a microscope.
Molds	A microorganism – fungi that form filaments and if not controlled, cause food spoilage.
Pickling	1. Fermenting food in a salt brine. An acid (lactic acid) is formed during the fermenting or brining process. 2. Using vinegar, (acetic acid) to make food high in acid.
Pressure canner	A large kettle with a lid designed to hold steam in the kettle. The lid is also equipped with a gauge for controlling pounds of pressure. All low-acid foods such as meat and vegetables are processed in a pressure canner.
Processing	The heating of food to destroy spoilage organisms.
Waterbath canner	Any large metal container may be used if it is deep enough for water to cover the tops of jars as much as 2 to 4 inches and boil freely. A rack is needed to hold jars off the bottom of the canner to allow water to circulate under them. The canner must also have a cover or lid. All acid foods such as fruits and pickles are processed in a waterbath canner.
Yeast	A microorganism – a very small plant that if not controlled may cause food spoilage.

INDEX

ACID FOODS 4, 7

ALTITUDE TABLES 8, 16

ALUM 27

ANSWERS TO CANNING QUESTIONS
- Fruits and Tomatoes 7
- Jams, Jellies, Preserves 44
- Pickles 37
- Vegetables 17

APPLES
- Apple Butter 42
- Apple Jelly 39
- Applesauce 9
- Crab Apple Jelly 40

APRICOTS
- Canned 9

ASPARAGUS
- Canned 18

BACTERIA
- Definition 45
- Clostridium botulinum 16, 28, 45

BEANS
- Dilled Green Beans 30
- Limas, Canned 18
- Snap, Canned 18
- Soy 18

BEETS
- Canned 19
- Pickled 30

BERRIES
- Canned 7, 9, 13
- Jam 40-42
- Jelly 39, 40
- Preserves 41

BLACKBERRIES
- Canned 7, 9, 13
- Jam 40
- Jelly 39
- Uncooked Jam 42

BLANCHING 25, 45

BLUEBERRIES
- Canned 7, 9, 13

BOILING WATERBATH 5, 7, 8, 27, 38, 45

BOTULISM 16, 28, 45

BREAD AND BUTTER PICKLED CUCUMBERS 30

BREAD AND BUTTER PICKLED SQUASH 34

CANNING JARS 5, 27, 36

CANNING
- Altitude Changes 8, 16
- Fruit and Tomatoes 9-12
- General Instructions 5, 7
- Methods 7
- Vegetables 15
- With Artificial Sweeteners 8
- With Salt 18-22
- Without Salt 25
- With Sugar 8
- Without Sugar 8

CANNING TIME CHARTS
- Fruits and Tomatoes 13
- Vegetables 23

CARROTS
- Canned 19

CATSUP AND SAUCES 34

CHERRIES
- Canned 10, 13
- Preserves 41

CHILI SAUCE 26, 34

CHOW-CHOW (PICCALILLI) 32

CHUTNEY
- Tomato Apple 33

CLOSTRIDIUM BOTULINUM 16, 28, 45

CORN
- Cream Style, Canned 19, 23
- Relish 32
- Whole Kernel, Canned 19, 23

CRAB APPLE JELLY 40

CUCUMBER PICKLES 26-37

DEWBERRIES
- Canned 7, 9, 13
- Jelly 40

DILL PICKLES 29, 30

ENZYMES 3, 45

EQUIPMENT AND UTENSILS 5, 7, 27, 38

FERMENTATION 28, 33, 45

FRUIT JARS 5

FRUIT JUICES 12

FRUITS
- Approximate Yields 7
- Canned 7-13
- Pickled 31
- Scorecard 14

GRAPE
Juice 12
Jelly 40

GREENS
Canned 17,21, 23

GREEN TOMATO PICKLES 32

HONEY (as a sweetener) 8

HOT PACK 7

JAMS 40-42

JAR LIDS 5

JELLIES 38-40
Remaking Soft Jelly 38

JUICE EXTRACTION 38

KALE (Spinach and Other Greens) 17, 21, 23

KETCHUP (see also CATSUP) 34

LIME 27

LOW-ACID FOODS 4, 5, 16

MELONS
Watermelon Pickles 33

METHODS OF CANNING 7

METRIC CONVERSION TABLE 44

MOLDS 3, 38, 45

MUSTARD GREENS (Spinach and Other Greens) 17, 21, 23

NO-SUGAR ADDED PICKLED PRODUCTS
No-Sugar Added Sweet Cucumber Slices 35

OKRA
Pickled 31

ONIONS
Pickled 31

PEACHES
Butter 42
Canned 12
Jam 40, 41
Pickled 31
Preserves 41

PEARS
Butter 42
Canned 10
Pickled 31
Preserves 41

PEAS
Blackeye, canned 20
Fresh, green, canned 20

PECTIN 38, 39

PEPPERS
Pickled 32
In Relish 32, 34

PICKLES AND RELISHES 26
Scorecard 36

PICKLE TROUBLES AND WHAT CAUSES THEM 37

PLUMS
Canned 7, 10, 13
Damson Preserves 41
Jelly 40
Jam 41

POTATOES
Sweet, Canned 22, 23
White or Irish, Canned 20

PREPARING FOOD FOR CANNING 9, 15

PRESERVES 41

PROCESSING EQUIPMENT
Boiling Waterbath Canner 5, 7, 8, 27, 38, 45
Pressure Canner 5, 7, 15, 25, 45

PROCESSING TIME CHARTS
Fruit 13
Vegetables 23

PUMPKIN
Canned 21, 23

QUICK DILL PICKLE 29

QUICK PARTY PICKLE 31

RASPBERRIES
Canned 7, 9, 13

RELISHES
Corn 32
Hot Onion Pepper 34
Scorecard 36
Squash 34

REPROCESSING 22

RHUBARB 10

SALT 25, 26

SAUERKRAUT 33

SEALING JARS 5, 27

SYRUPS FOR CANNING FRUIT 8

SOUPS 21

SPINACH 17, 21, 23

SQUASH
Canned 22
Bread and Butter Pickled 34
Fresh Pack Pickled 35
Relish 34

STEAM PRESSURE CANNER 3, 15, 16, 45

STORING 17, 22

STRAWBERRIES
Canned 11
Jam 41
Preserves 41
Uncooked Jam 42

SUGAR
Canning Without 8
In Pickle and Relish recipes 27

SWEET PICKLE STICKS 29

TABLES
Altitude Charts 8, 16
Yield from Fresh Fruit 7
Yield from Fresh Vegetables 17
Syrup for Canning 8

SCORECARDS
Fruits 14
Pickles and Relishes 36
Jams, Jellies and Preserves 43
Vegetables 24

TERMS 45

TESTS
For jelly 39

TOMATOES
Canned 8, 11, 22, 23
Catsup 34
Chili Sauce 34
Green Tomato Pickles 32
Juice 12, 13, 22, 23
Sauce 12

TURNIP GREENS (Spinach and other greens) 17, 21, 23

VEGETABLES
Approximate Yields 17
Canned 15-23
Pickled 26

VINEGAR 26

WATERBATH CANNER 5, 7, 8, 27, 38, 45

WATERMELON
Pickled Rind 33

YEASTS 3, 45

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